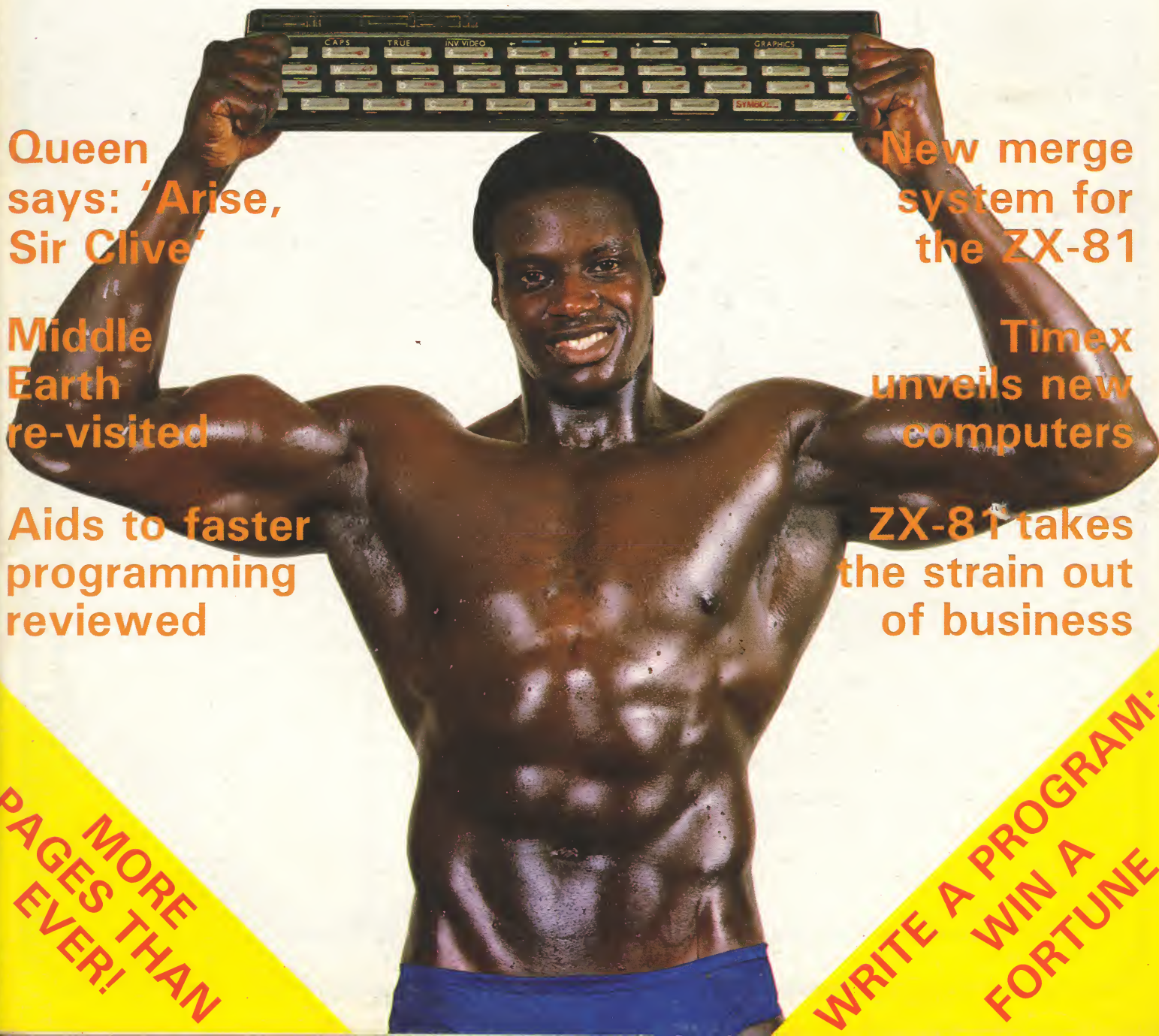


sinclair user

75p

Issue No 17

STRETCH YOUR SPECTRUM TO ITS LIMITS



Queen
says: 'Arise,
Sir Clive'

Middle
Earth
re-visited

Aids to faster
programming
reviewed

New merge
system for
the ZX-81

Timex
unveils new
computers

ZX-81 takes
the strain out
of business

MORE
PAGES THAN
EVER!

WRITE A PROGRAM:
WIN A
FORTUNE

COMPETITION-PRO JOYSTICK

PRECISION GAME CONTROL!

SPECTRUM JOYSTICK
NOW AVAILABLE FROM
WHSMITH 



Outstanding Features

- Self centring stick
- Super strong nylon and steel construction
- A total of 8 directions *plus* 2 large fire buttons (for left or right handed operation)
- Arcade proven moulded leaf switches ensure incredible reliability
- Complete with boxed interface on Spectrum models
- A wide range of Joystick compatible software readily available from W H Smith and leading computer shops or direct from us



NEW

Conversion Tape I Only £4.95 - Converts seven leading arcade games to run with the Kempston Joystick: Horace Goes Skiing - Sinclair, Hungry Horace - Sinclair, Flight Simulation - Sinclair, Arcadia - Imagine, Penetrator - Melbourne House, Spectres - Bug Byte, Space Zombies - Mikrogen.

ALSO

Conversion Tape II Only £4.95 - Converts: Orbiter - Silversoft, Escape - New Gen, Tanx - DK, Tronics, Centipede - DK, Tronics, Spectral Invaders - Bug Byte, Cruising On Broadway - Sunshine, Frenzy - Quicksilver (Early Versions).

Joystick Compatible Spectrum Software now available from Kempston:

■ Astro Blaster ■ Blind Alley ■ Cosmic Guerilla ■ Cosmos ■ Cyber Rats ■ ETX ■ Frenzy ■ Frogger ■ Galaxians ■ Gulpman ■ Jet Pac ■ Joust ■ Knot in 3D ■ Mazeman ■ Meteoroids ■ Night Flite ■ PSSST ■ 3D Tunnel ■ Time Gate ■ Slippery Sid ■ Spookymon ■ Sheepwalk ■ 3D painter ■ Bozy Boa ■ Violent Universe.

Hardware I wish to order the following:

- | | |
|---|------------|
| ☐ New Spectrum Joystick Interface, allows you to use any Atari/Commodore type joystick with Spectrum | (@ £15.00) |
| ☐ Spectrum Joystick including interface | (@ £24.99) |
| ☐ VIC 20, Commodore 64, Atari 400/800 Joystick | (@ £14.50) |

AMOUNT

Please tick appropriate boxes
All prices include P&P and VAT. Overseas prices add £4.00 P&P

TOTAL

Cheques/postal orders should be made payable to Kempston (Micro) Electronics Ltd
Please debit my Access/Visa* Account (*delete as applicable)

Account No _____

Signature _____ Name _____

Address _____

Please post to Kempston (Micro) Electronics, Dept SU8
180a Bedford Road, Kempston, Bedford, MK42 8BL

SOLE UK DISTRIBUTOR

Kempston
MICRO ELECTRONICS



sinclair user

incorporating Spectrum User

Editor

Nigel Clark

Illustrator/Designer

Brian King

Consultant editor

Mike Johnston

Production editor

Harold Mayes MBE

Staff writer

John Gilbert

Program reviewer

Rebecca Ferguson

Editorial director

John Sterlicchi

Advertisement manager

John Ross

Sales executive

Annette Burrows

Editorial assistant

Margaret Hawkins

Production assistant

Dezi Epaminondou

Managing director

Terry Cartwright

Chairman

Richard Hease

**Sinclair User is published monthly
by ECC Publications Ltd.**

Telephone

All departments

01-359 7481

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:

Sinclair User and Programs,
ECC Publications,
30-31 Islington Green,
London N1 8BJ

Programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.

We pay £10 for the copyright of each program published and £50 per 1,000 words for each article used.

© Copyright 1983

Sinclair User

ISSN No 0262-5458

Printed and typeset by

Cradley Print PLC,

Warley,

West Midlands

Distributed by

Spotlight Magazine Distribution Ltd,

1 Benwell Road,

Holloway,

London N7

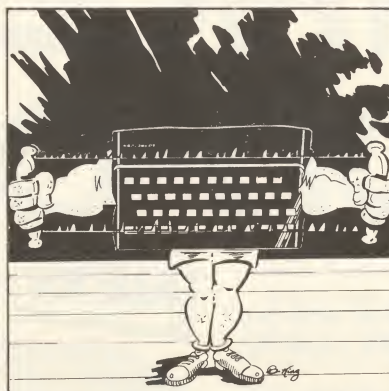
01-607 6411

Cover Photograph:

Colin Packam

Cover Illustration:

Brian King



5 SINCLAIRVOYANCE The days of amateurism are over and soon the costs of entering the Sinclair market could mean that the days of the small company are numbered.

9 SINCLAIR USER CLUB With the cessation of the National ZX Users' Club, we make a special offer to former members to allow them to continue to take advantage of club facilities.

13 NEWS Clive becomes a knight; Timex announces its plans for its new computers; and much more.

17 LETTERS Tips on programming, comments on articles, and views on software.

23 HARDWARE WORLD We expand our add-on reviews this month to take account of the increasing number of ways you can improve your machine.

31 SOFTWARE SCENE Another three pages of cassettes for the Spectrum and ZX-81.

36 CAMBRIDGE AWARD Your chance to become the first holder of the Cambridge Programming Award.

43 SPECTRUM EXPANSION Cover story. Stephen Adams reviews the alternatives to upgrading your 16K Spectrum to 48K.

48 DISASSEMBLERS John Gilbert follows his article on assemblers by assessing their companions, the disassemblers.

57 PROGRAM PRINTOUT Fourteen pages of listings for the Spectrum and ZX-81.

78 USER OF THE MONTH Our popular feature is about a businessman and his wife who have found the ZX-81 to be a great help in their company.

86 PROGRAMMING Nick Goldman and Jerry Seabridge show how two programs can be merged on the ZX-81.

93 BOOKS John Gilbert reads more from the growing Sinclair bookshelf.

101 STARTING FROM SCRATCH Our regular article for those who have just been converted to the wonders of Sinclair computers.

102 SINCLAIR SIMON Simon and the knighthood.

110 HELPLINE Andrew Hewson turns his attention to machine code programming.

117 MIND GAMES In a special three-page article, Quentin Heath makes a last journey to Middle Earth and answers many of the queries about The Hobbit.

NEXT MONTH

Continuing our series of articles on programming, we give some hints on how to write your own chess program and we speak to Bill Matthews, the man who holds the purse strings at Sinclair Research.

Spectrum
16k-48k
Series B

£22!
ONLY

SINCLAIR

ADD-ON OFFER

from 16k – 48k

With our ME48 memory expansion add-ons your ZX Spectrum can increase its capacity by up to three times.

★ No soldering ★ easy to fit ★ simply plug in ★ fully guaranteed ★ no loss of memory through wobble or white out.

NB. Before ordering your Spectrum add-on please check which Spectrum you have in your possession. At the back of the ZX Spectrum the metallic contact strips can be clearly viewed. In the series A the space separating the strips is the same width as the strips. In the series B the strips are twice as wide as the space between.

SPECTRUM	ZX81
ME16-48 Series A £34.50	ME1-16 £19.25
Series B £22.00	ME1-64 £44.25
ME16-80 Series B £46.00	

FITTING/TESTING SERVICE. While-you-wait, personal callers Monday-Friday 9.30-5.00, £3.00. By return registered post £7.00.

FANTASTIC

ZX81 & SPECTRUM
SS1 SPEECH SYNTHESISER

SIZE 3½" x 5¾" x 1"

- ★ Make amazing speech effects with your ZX Spectrum.
- ★ Specially designed for use with your Spectrum. Just plugs in, no dismantling or soldering.
- ★ No power pack, leads, batteries or other extras.
- ★ Ample volume for built in loudspeaker, Manual Volume Control on panel. Can be plugged in to Existing hi-fi system.
- ★ Uses no memory addresses.
- ★ Free Dictionary of Sounds.

SS1 SPEECH SYNTHESISER £39.00

NEW LEVEL-VU PRISM

Allows you to see your tape counter without moving from your seat!

- ★ attaches easily to recorder body or lid
- ★ fits most recorders including Radio Shack, Vic-20, Atari
- ★ greatly magnifies counter numerals

LVP £3.99

★ All items are normally despatched within 24 hours

COMPUTER ADD-ONS

7-9 Thane Works, Thane Villas, London N7 Tel: 01-609 7919

NEW TAPE LOAD ANXIETY?
Vu-Load takes the frustration out of loading your ZX81 or Spectrum programmes.

- ★ helps to ensure programme load every time
- ★ monitors tape output level
- ★ gives positive save indication
- ★ detects blank tape without disconnecting cassette wires
- ★ ready to use – no wiring

TL £19.99

NEW EXTERNAL MEMORY FOR THE SPECTRUM!

Upgrade your Spectrum to 48K with the new ME16-48E suitable for series A and B

- ★ Plugs into the back of your Spectrum
- ★ Specially designed to avoid loss of memory through wobble or white out
- ★ Has a 'piggy back' connector so you can add other peripherals like the Spectrum printer etc.

ME 16-48E £39.95

NEW MICRO TAPE save it – first time on American microtape
★ specially designed for use with micro computers

- ★ Low drop out occurrence
- ★ uniform coating
- ★ High saturation level
- ★ So good, we can guarantee them for 12 months

AUDIO DIGITAL AD.C12 – 55p AD.C15 – 60p AD.C20 – 65p

★ **Free 23 line memory test programme with every add-on.**

Post and packing still only 40p per item.

Please tick the appropriate box to order your Computer Add-on:

Memory Expansion Spectrum ME16-48 Series A ☐ Series B ☐
ME16-80 Series B ☐ ZX81 ME1-16 ☐ ME1-64 ☐

Speech Synthesiser SS1 Spectrum ☐ ZX81 ☐ Tape Load TL ☐

Level VU LVP ☐ ME16-48E ☐ Audio Digital AD.C12 ☐

AD.C15 ☐ AD.C20 ☐

*NB. Add 40p Post & Packaging to the price of all items.

I enclose a cheque or postal order for _____ made payable/crossed to Computer Add-ons, or I would like to pay by Access ☐ or Barclay Card ☐ and I enter my number and signature accordingly *Allow 28 days for delivery.

Signature _____

Date _____

Name _____

Address _____

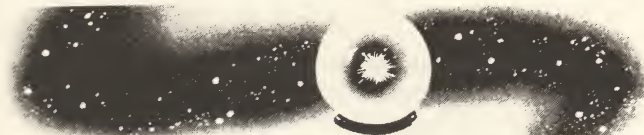
Occupation _____ SU5

COMPUTER ADD-ONS 7-9 Thane Works, Thane Villas London N7

Market loses its innocence

FOR THOSE ROMANTICS who used to find the amateurism of much of the Sinclair market appealing, we have some bad news. There are signs that the dreams of being able to write a brilliant program and then make a fortune from it using the garage as business premises may soon be unfulfilled.

The latest signs of the major change are the entry of the record companies into the market. Virgin and K Tel have



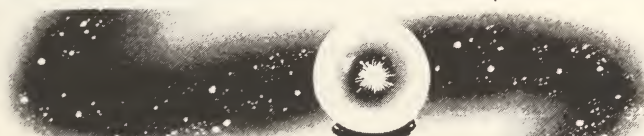
been the first to take the plunge but no doubt others will follow quickly, bringing with them all the razzmatazz and hype associated with the promotion of pop music.

An example of what to expect was the launch of Virgin Games at the Garden Club, the former roof garden at Derry and Toms. Loud music, large crowds, a Maggie Thatcher impersonator and, almost as an afterthought, the games being shown and their writers wandering around looking a little lost.

That may have been the latest sign but the moves away from the old, friendly, low-key activities of the early market when a few people selling games from wooden desks was considered a big event have been happening subtly for the last year.

The changes in the popular ZX Microfairs have shown what has been happening. Originally it was a small group of companies selling their wares on bare trestle tables, with little thought given to presentation. At the recent fair at Alexandra Pavilion in north London, a number of bigger companies like Quicksilver, dK'Tronics and Kempston had specially-designed stands and more companies are thinking of doing the same thing.

At the same time, Imagine made a name for itself by being the first company not to follow the usual method of steady growth. After the founders broke with Bug-Byte, they announced their presence with colour advertisements through-



out the home computer press to establish themselves quickly in a booming market.

It is a move which appears to have been a success, with many of the company's games featured regularly in the Top Ten software sales.

The effect of all the changes has been to raise the threshold of entering the Sinclair market. It is still possible to follow the 'amateur' route of writing a program and to start selling it through small advertisements in *Sinclair User*. That will no doubt continue to prove profitable but for a program to make really big money it will now need a major launch. Without strong financial backing and a supporting catalogue of other software, that would be impossible.

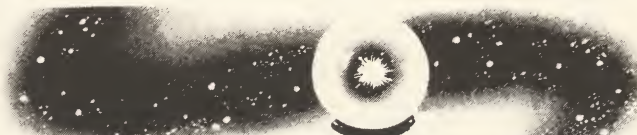
It would be much easier to go to an established company and let it look after the marketing and to pay you a royalty on the sales. Apart from allowing you to enter the market more

quickly, it also removes what can be a major headache.

The eventual change of the market into something more similar to that of records has been mentioned previously a number of times in this column. While many people might feel that it is a change for the worse, it is one which must happen if home computing is to fulfil its promise of becoming a major leisure industry in the next few years.

When the market was new and small, people were more willing to tolerate delays and poor quality because that was to be expected from new and inexperienced developments. As more people have become hooked by home computing, the tolerance level has fallen.

If sales are to continue to grow, the need for tips on how to do many of the basic things in the hobby, such as **LOADing** and **SAVEing**, must disappear. No-one expects to buy a record



and then find they have to spend half an hour adjusting a music centre before they can play it.

In the same way people should be able to buy a program and have no difficulty **LOADing** it. The introduction of ROM cartridges is a great help in that, as has already been recognised in the States.

For those who are worried that the ethics of the music industry may be the deathknell of home computing as they know it, it has a number of differences which should ensure that does not happen. For a start, while it is possible to have Top Ten-selling cassettes we are unlikely to have Top of the Cassettes on television and day-long radio programmes promoting the latest releases.

Also, unlike the music industry, it is possible to derive plenty of enjoyment from using a computer without having to buy other people's programs. It can be costly making your own record but for the computer you have to pay only for the cassette and take time to record your program and, after all your work, you may be able to make a fortune.

Arise, Sir Uncle Clive

WE CONGRATULATE Sir Clive on his knighthood, even if it presents some problems to his many supporters. Do they call him Sir Uncle Clive or Uncle Sir Clive? We are sure the difficulty will not last for long.

There can be no doubt that he has done a great job for the British computer industry and has made the sector one of the few bright lights in the general gloom of British manufacturing. That has been achieved on the success of only one good idea, the cheap home computer.

That resulted in a rapid rise to fame and fortune. It also engendered a belief that he can be seen as a saviour of British industry and that only stimulates growing pressure—increased by the news that he has an option on the factory of that former saviour of Northern Ireland, John de Lorean.

The more honours Sir Clive receives, the more the pressure grows and the more difficult it will be to live up to expectations.

dk'tronics

ZX KEYBOARD FOR USE WITH 81 SPECTRUM

Our new cased keyboard has 52 keys, 12 of which are used for the numeric pad. The numeric pad offers useful features, you can cursor with one hand and it will be a boon for anyone who enters a lot of numeric data. The pad is a repeat of the 1 - 9 keys, it also has a full stop and a shift key. The numeric pad keys are red in colour, the normal keyboard keys are grey, with the case being black, which results in making the keyboard very attractive. The keyboard case dimensions are: 15" x 9" x 2½". The computer (either 80/81 or Spectrum), fits compactly inside.

You will have to remove the computer from it's original case, it is then screwed to the base of the case. The case has all the bosses already fitted and the screw holes are marked. Also fitted inside the case is a mother board (81 model only) which allows 16K, 32K and 64K to be fitted in the case. All connectors are at the rear of the case i.e. Power, Mic, Ear, T.V. and the expansion part. The case is large enough for other add-ons also to be fitted inside. One of these could be the power supply then you could very quickly fit a mains switch or a switch on the 9V line. This means you have a very smart contained unit. This case does not stop you from using any other add-ons that you may have eg Printer etc. We are convinced that this is the best keyboard available at present. It offers more keys and features than any other keyboard in it's price range.

NOTE...

The case can be purchased separately with the keyboard aperture uncut, therefore if you possess one of our early uncased keyboards, or in fact, any other suppliers' keyboards these could be fitted. The keyboard is connected to your computer by a ribbon cable and this has connectors fitted which simply push into the Sinclair connectors. It is a simple two minute task and requires no electronic skills. This keyboard does not need any soldering. Please specify on order whether you require the ZX81 or Spectrum case.

SPECTRUM MODEL

This is supplied with Spectrum legends, and a slightly different base for fitting the Spectrum inside, again, all the connectors are at the rear of the case and there is plenty of room for the power supply (and other add-ons). Should you wish to change, we can supply both the Spectrum legends and details of updating your case which will enable modification from the ZX81 to Spectrum. PLEASE specify on your order whether you require the ZX81 or Spectrum inside.

MEMORY FOR ZX 81

16K Memory £22.95
64K Memory £52.95
16K (Uncased) £19.95
64K (Uncased) £49.95

SPECTRUM MEMORY

MKI £30
MKII £30



dk'tronics

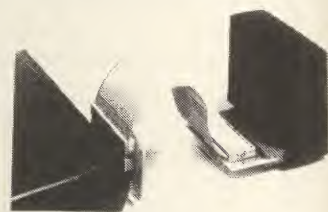
DK Tronics, Unit 2, Shire Hill Ind Est, Saffron Walden
Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 lines.



£45

FLEXIBLE RIBBON CONNECTOR

If you have ever had white outs or system crashes this could be the answer. It stops the movement between the computer and the RAM expansion, it is supplied with a ribbon 6 inches long, with a male connector at one end and a female at the other.



ONLY £10

ZX 80/81 SPECTRUM HARDWARE

SPECTRUM/81 TOOLKIT BOTH AT ONLY £6.95

This is the toolkit which won acclaim in the feature in the August 1982 issue of Sinclair User. "It is the most impressive program, fast in execution with clear and full instructions. . . it stands out from the rest of the field". The ZXED is a powerful editor for use on the expanded ZX81. It is intended for use by the serious BASIC programmer and offers several useful and time saving features most helpful during all stages of program development. The facilities provided are as follows: ALTER, BYTES, COPY, DELETE, FIND, HELP, INSERT, KEEP, MOVE, RENUMBER, AND VERIFY.

The Spectrum Toolkit contains most of the features above plus autoline numberer and append, and will run in the 16K and 48K Spectrum.

4K GRAPHICS ROM £24.95

This module unlike most other accessories fits neatly inside your computer under the keyboard. The module come ready built fully tested and complete with a 4K graphic ROM. This will give you an unbelievable number of extra pre-programmed graphics. This now turns the 81 into a very powerful computer with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders, graphics and that only accounts for about 50 of them, there are still approximately 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there, it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

SPECTRA~SOUND

The so called speaker in your Spectrum is really only a 'buzzer'. With the DK Tronics "SPECTRA SOUND" you can generate fully amplified sound through the speaker on your T.V. set. SPECTRA-SOUND is a very simple but highly effective add-on. This means that you no longer have a faint beep but a highly amplified sound, which can be adjusted with the TV volume control.

The SPECTRA SOUND fits compactly and neatly inside the Spectrum case and is connected by three small crocodile clips.

NEW AT ONLY £2.95

£19.95

Light Pen

LIGHT PEN

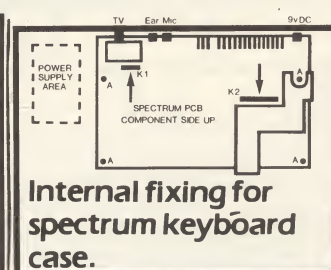
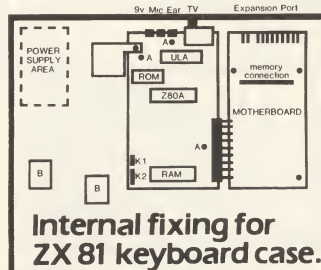
The pen enables you to produce high resolution drawings on your own T.V. screen. The controlling software supplied with the light pen has 16 pre-defined instructions. These are chosen from a menu positioned



at the bottom of the screen next to the pen. You can utilise the menu for changing colour (Border, Paper, Ink). Drawing circles, arcs, boxes, lines. You are also able to fill any object with any colour, and insert text onto the screen at any chosen place. Of course you can also draw freehand. There is a feature to retain the screens and animate. On the 48K Spectrum you can retain 5 screens. You can also use the machine code on it's own in your own programs, for selecting out of a menu etc. The software provided will return with the X,Y, cords for it's position on the screen.

The light pen is supplied with a control interface in order to adjust the sensitivity/pen alignment.

This simply plugs into the ear socket on your spectrum. Should you require further details please send a S.A.E.



Please state type of machine, which ROM memory size, quantity, and place when ordering.

Please send me @ £

Please send me @ £

Please send me @ £

Please add on £1.25 for p/p

I enclose cheque/P.O. payable to DK Tronics total £.

or debit by Access/Barclaycard No.

Signature

Name

Address

Send to DK Tronics, Unit 2, Shire Hill Ind Est, Saffron Walden, Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 lines.

"IT LOOKS NICE BUT WHAT THE HELL CAN I DO WITH IT?"

Every ZX SPECTRUM Print'n'Plotter Jotter has 100 pages of finely printed screen grids.

50 for the high resolution screen. 50 for the normal character screen.

With these at your disposal you can plan practically any graphics print-out to program into your computer.

The high-resolution PLOT grid shows every one of the 45,060 pixels! Every one printed. Every one with its co-ordinate numbers. This gives you enormous graphics power to DRAW, PLOT, CIRCLE, PLOT OVER and so on in any position or screen building up graphic drawings, charts, maps... in fact anything without the complications of guesswork, integer out of range, or wrongly positioned pixel colours which change PRINTED INK characters!

The normal character PRINT grids on the other hand will allow you to be specific about PRINT AT, TAB, PRINT OVER, SCREENS and INK / PAPER in direct co-ordination with PLOT... you see every page is printed on **high quality tracing paper**... ideal to overlay on to illustrations and 'copy' or co-ordinate.

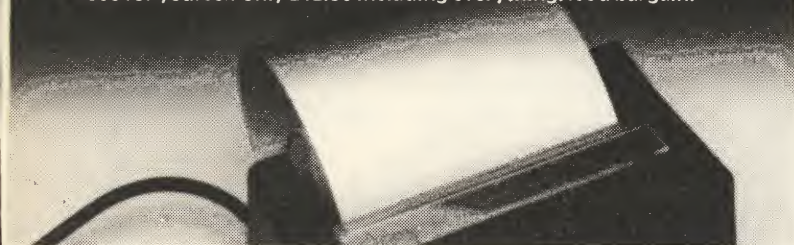
And there's another bonus, because each page contains 24 User-definable grids — **2400 per pad!**

With 50 pages of PLOT grids, 50 pages of PRINT grids 2400 user-definable grids, a set of colour pens, a printed PIXEL RULER and our Special Offer of demo programs, IT'S THE BEST VALUE IN ZX GRAPHICS PROGRAMMING.



"PRINTER PAPER THAT WORKS? I DON'T BELIEVE IT!"

Five rolls of our PRINTER PAPER will only cost you £12.50 including postage, packing and VAT! And you'll gain a great deal more! It prints beautifully. It's not too thick. It's not too shiny. Print is black — not grey. It actually feeds through the machine! See for yourself only £12.50 including everything. It's a bargain!



"NOW WHICH KEY DO I PRESS TO SHOOT DOWN THE THING FROM MARS?"

Ever forgotten which key to press when playing a game? Do you suffer from a mind-boggling mass of programmed keys? Do you write programs that use different keys to perform various functions? If so, we have just the thing for your ZX SPECTRUM.

A pack of Print'n'Plotter Keyboard Overlays.

Just write the function or functions under each key you program and keep the overlay for the next time you play the game. Of course there's lots of more uses you will find for our OVERLAYS, user defined characters, keyboard scanners, mathematical programs, business uses — to name just a few.

There's TEN OVERLAYS to a pack — so you can program with impunity! And they fit perfectly onto your standard ZX SPECTRUM KEYBOARD. Each OVERLAY is printed with the cursor movement key directions and there's room for program name etc.



A SPECTRUM CONSOLE THAT EVERYONE CAN AFFORD!

For the cost of a 'games' cassette you can have a truly professional console for your SPECTRUM!

We've cut costs (not cut quality) by designing a self-assembly method using relatively inexpensive materials like strong corrugated board.

The result is a console that's tough, light, highly finished and capable of giving years of useful service.

Facilities include ergonomic keyboard angle, access to rear of machine, choice of P.S.U. Internal or external, and alternative of Printer on-board or cassette storage area. Fully illustrated instructions are included.



"WHERE CAN I GET THEM?"

You can see and buy most of our products at:
W. H. Smith (Computer Stores)
Boots (selected branches)
Buffer Micro (Streatam 01-769 2887)
Microware (Leicester 0533 29023)
Dennys Bookshops (London EC1 01-253 5421)
Personal Computer Services (Darwin Lancs 0254 776677)
Telford Electronics & Computing (Shirhall 0952 460008)
Georges Bookshop (Bristol 0272 276602)
Microtech Systems (Gillingham Kent 0634 571321)
Northampton Home Computer Centre (0604 225339)
Philip Copley Hi Fi (Ossett W. Yorks 0924 272545)
Darlington Computer Shop (Darlington 0325 487478)
Lancashire Micros (Morecambe Lancs 0524 411435)
North East Computers (Peterhead 0779 799000)
Photo-Video (Hereford 0432 267997)
Computers for All (Romford 0708 752862)
March Software (Sawbridgeworth Herts 0279 724341)
Evesham Micro Centre (Worce 0586 48635)
Computer City (Widnes, Cheshire 051 420 3333)
Landau Electronics (Sutton 01-643 5494)
D&J Computers (Stevenage 0438 65501)
Software Machine (London SE3 01-305 0521)
Screen-Scene (Cheltenham 0242 28979)
Hobbyhorse (Lincoln 0522 35227)
Micro Home Computers (Orkney 0856 3283)

Educational Supplies through Griffin & George Ltd.
Australasian agents: Centrium Systems. Tel: (Perth) 4441031.

Post today to Print 'n' Plotter Products, 19 Borough High Street, London SE1 9SE or phone: 01-403 6644 (General) or 660 7231 (Credit Card Sales).

Name:

Address:

.....

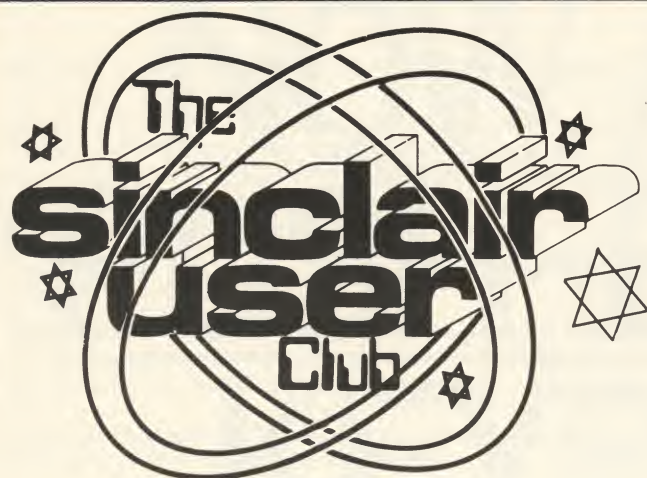
.....

- ZX SPECTRUM JOTTER @ £9.95 each
- ZX SPECTRUM KEYBOARD OVERLAYS @ £2.95 per pack
- ZX SPECTRUM CONSOLE @ £5.25 each
- ZX PRINTER PAPER @ £12.50 per five rolls
- ZX SPECTRUM DEMO CASSETTES @ 95p each
- ZX81 JOTTER PADS @ £3.50 each
- ZX81 FILMS @ £2.25 each
- ZX81 GRAPHICS PROGRAMMING GUIDE @ £1.50 each

Remittance enclosed. Please bill my Access / Barclaycard / Visa / Mastercard No:

**Print'n'plotter
Products**

All prices include VAT, P & P. Overseas orders please add 25% for additional surface mail.



Hestacrest is giving a discount on account

BOTH SINCLAIR machines are being used for business applications by small companies and individuals who want to keep their finances in order. There are many good programs on the market which take care of small company finances and as a result we are offering some of the best business software for both machines.

There are two types of accounts preparation programs for both machines. The **Sole Trader/Partnership** program deals with the accounts of a company which has up to four partners. The second program deals with a limited company's accounts. For all

games enthusiasts we are offering new games from Mikro-Gen and Saturn Developments.

The offers are open only to members, although members enrolling this month can take advantage of the offers by including orders with registration forms. Existing members should send cheques to: **Hestacrest Ltd**, PO Box 19, Leighton Buzzard, Beds LU7 0DG.

Saturn Developments, Dept PK, 37 Heol Durlais, Birchgrove, Swansea, SA7 9LT.

Mikro-Gen, 24 Agar Crescent, Bracknell, Berkshire. RG12 2BK.

	List price	Offer price
Hestacrest Ltd		
SPECTRUM 48K		
Accounts — Limited Company	£25	£20
Accounts — Sole tdr/partnership	£25	£20
Combined price for Limited Company and Sole Trader/Partnership	£35	£28
Sales/purchases	£25	£20
ZX-81 16K		
Accounts — Limited Company	£17.50	£14
Accounts — Sole Trader	£17.50	£14
Combined price for Limited Company and Sole Trader	£25	£20
Sales	£20	£16
Purchases	£20	£16
Combined price for Sales and Purchases	£25	£20
Mikro-Gen		
Mad Martha Spectrum 48K	£6.95	£5.75
Saturn Developments		
Lunar Rescue ZX-81 16K	£4.95	£3.95

Special fee for former National ZX User members

Welcome offer to Nationals

FOLLOWING the ending of the National ZX Users' Club, the Sinclair User Club is now the largest club for users of Sinclair computers. It began less than 10 months ago and now has more than 1,100 members.

We would like to welcome former members of the national club who still wish to take advantage of all the benefits of belonging to a large organisation. As a special offer to them we are willing to offer for a limited period a special membership fee.

For only £11 they can have the benefits of joining the Sinclair User Club and joining the many others who have already seen what we have to offer.

The benefits include special exclusive discounts on most of the leading items of software and hardware. This month's offer can be seen on this page. Examples from recent months include the full range of software from Quicksilver and the Digital

tracer from RD Laboratories. To keep members in touch with what is happening in the club, two pages in *Sinclair User* are devoted to club news and there is a special cassette news-letter which is published every two months.

It includes news of the club, programming hints, programs and the number of the telephone advice service. That service has proved very popular and is available to members at most times for immediate help with any of their problems.

The club now has members throughout the world, including most parts of Europe, many in Africa, and one in Papua New Guinea.

Unfortunately we have to place a time limit on this special offer, the final date being August 31. We shall also need some proof of membership of the National ZX Club. The title page of a recent issue of *Interface*, complete with the date would be sufficient.

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name

Address

.....

.....

.....

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 30-31 Islington Green, London N1 8BJ. Cheques should be made payable to Sinclair User Club.

Sinclair User Club

Britain

Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street, Aylesbury (5181 or 630867). Meetings: first Wednesday and third Thursday of the month.

Basildon Microcomputer Club: Roger Sims, Wickford 63032, after 6.30pm. Meetings every other week on Tuesdays from 7.30 to 10pm at Healey Management Services, The Hemmels, Laindon, Essex.

Bristol Yate and Sodbury Computer Club: 99 Woodchester Yate, Bristol, BS17 4TX.

Colchester Sinclair User Group: Richard Lown, 102 Prettygate Road, Colchester CO3 4EE.

Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357. Meetings held on second and fourth Wednesday of each month.

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham NG16 3BJ.

Edinburgh ZX Users' Club: J Palmer (031 661 3183) or Ken Mitchell (031 334 8483). Meetings: second Wednesday of the month at Claremont Hotel.

EZUG-Educational ZX-80-81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.

Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverton 55068). Meets every other week on Wednesday evenings.

Glasgow ZX-80-81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241). Meetings: second and fourth Monday of each month.

Gravesend Computer Club: c/o The Extra Tuition Centre, 39 The Terrace, Gravesend, Kent DA12 2BA. Bi-monthly magazine and membership card.

Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).

Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourrock, Renfrewshire PA19 1PL (Gourrock 39967). Meetings: Every other week on Monday at Greenock Society of the Deaf, Kelly Street, Greenock.

Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).

Lambeth Computer Club: Robert Barker, 54 Brixton Road, London SW9 6BS.

Liverpool ZX-Computer Centre: Keith Archer, 17 Sweeting Street, Liverpool 2.

Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.

Micro Users' Group: 316 Kingston Road, Ewell, Epsom, Surrey KT19 0SY.

National ZX-80 and ZX-81 Users' Club: 44-46 Earls Court Road, London W8 6EJ.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30 to 10 pm. Further information from R G Martin (0782 62065).

North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.

Northern Ireland Sinclair Users' Club: P Gibson, 11 Fitzjames Park, Newtownards, Co Down BT23 4BU.

North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 each Monday, 6pm.

Nottingham Microcomputer Club: ZX-80-81 users' group, G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).

Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.

Scunthorpe ZX Club: C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).

Sheffield ZX Users' Club: A W Moore, 1 Ketton Avenue, Sheffield S8 8PA, Yorkshire. Annual subscription 10, monthly newsletter and cassette.

Sittingbourne: Anurag Vidyarth (0795 73149). Would be interested to hear from anyone who wants to start a club near the Medway towns.

Stratford-on-Avon ZX Users' Group: Chris Parry, 16 Sackville Close, Stratford-on-Avon, Warwickshire.

Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).

Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.

Sutton: Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.

Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068). Meetings: Woodsprings Inn, Worle, on alternate Mondays.

ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

ZX Guaranteed: G A Bobker, 29 Chadderton Drive, Unsworth, Bury, Lancashire. Exchanges information and programs throughout the country.

ZX-80/ZX-81 Users' Club: PO Box 159, Kingston-on-Thames. A postal club.

Overseas

Belgium: ASBL BDMA Belgium National Sinclair Club; P Glenisson, Rue De l'Epeestraat, 14, 1200 Bruxelles.

Belgium, France and Luxembourg: Club Sinclair, Raymond Betz, 38 Chemin du Moulin 38, B-1328 Ohain, Belgium (322 6537468).

Belgian User Group for Sinclair owners (BUGS); Op de Beeck, Patrick, Drabstraat 144, 2510 Mortsel.

Micro-Europe Club; R Betz, Chemin du Moulin, B1328, Ohain, Belgium. Telephone: CCP 000 0846556-37.

Denmark: Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.

ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

J Niels-Erik Hartmann, OZ-ZX-Radioamatør, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.

East Netherlands: Jonathon Meyer, Van Spaen Straat 22, 6524 H.N. Nijmegen; (080 223411).

Germany: ZX-80 Club, a postal club; contact Thomas Jencyzyk, Hameln, Postfach 65 D-3250 Hameln, Germany.

Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkukg, Jakarta, Utara, Indonesia.

Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).

Italy: Sinclair Club, Vie Molimo Vecchio so/F, 40026 Imola, Italy. Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.

Micro-Europe: Belgium or Club Paris-Micro, 19 Rue de Tilly, 92700, Colombes, France; associated with Club Micro-Europe.

Republic of Ireland: Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Eric Mortimer, 1D Wilmer Court, Leonie Hill Road, Singapore.

South Africa: Johannesburg ZX-80-81 Computer Users' Club: S Lucas, c/o Hoechst SA (Pty) Ltd, PO Box 8692, Johannesburg.

Johannesburg ZX Users' Club: Lennert E R Fisher, PO Box 61446, Marshallstown, Johannesburg.

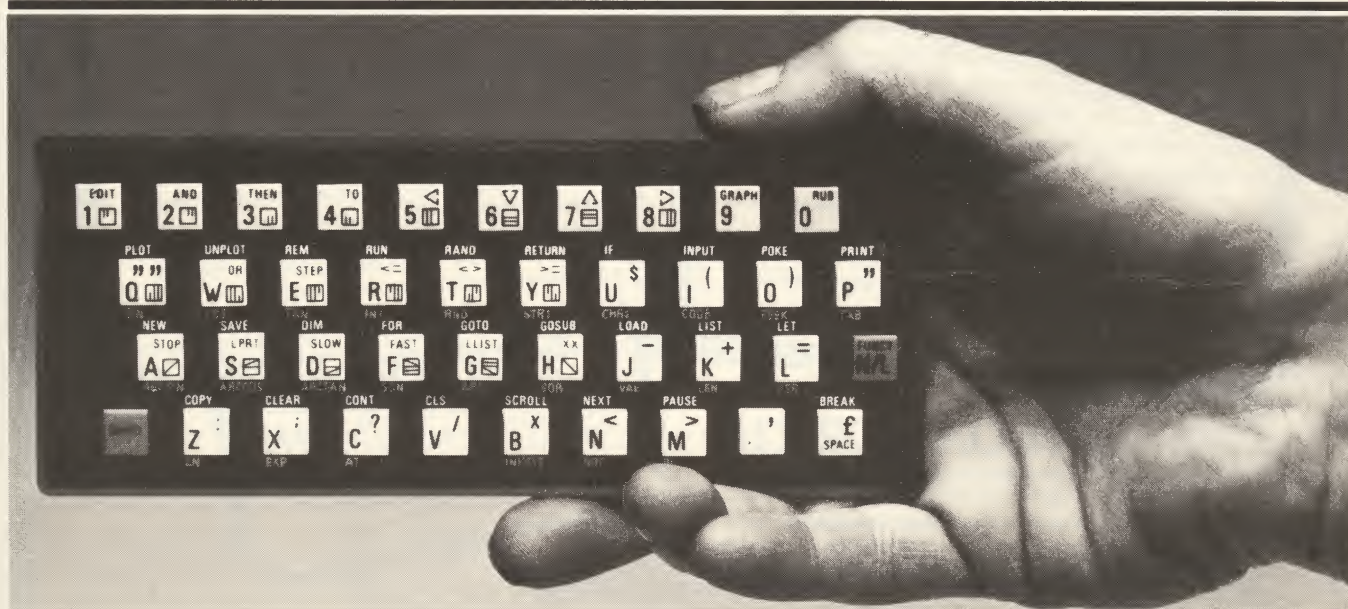
Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.

ZX Club Spain; C Benito PO Box 3253, Madrid, Spain.

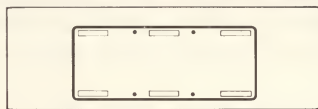
Swedish ZX-club: Sinclair Datorklubben, Box 1007, S-122, 22 Enskede, Sweden.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611.—Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967).

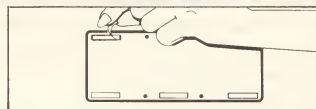
NOW. A ZX81 PUSH-BUTTON KEYBOARD FOR UNDER £10.



1. Make sure the original keyboard is clean and check that all the keys function.



2. The Buttonset is held in place by self-adhesive pads.



3. So all you do is remove the protective backing.



4. And place it centrally on your ZX81.

At last there's a really cheap but efficient way of ironing out the ZX81's only real bug: its keyboard. The Filesixty Buttonset offers:

- A full-travel calculator-type moving keyboard for only £9.95.
- Installed in seconds. The peel-off adhesive backing means you just register into position and press.
- No messy labels, dismantling or soldering.
- 3 groups of colour keys to pick out shift, numerals and newline.
- Precision moulded in ABS to match your ZX81, with contrasting legends for maximum legibility.

Filesixty Ltd., 25 Chippenham Mews, London W9 2AN, England.
Tel: 01-289 3059. Telex: 268 048 EXTLDN G 4087.

Orders to Filesixty Ltd., FREEPOST, London W9 2BR.

Cheques/PO made payable to Filesixty Ltd.

Please send me _____ (qty) Buttonset(s) at £9.95 each (including VAT and P&P).

Total £ _____ BLOCK CAPITALS

Name _____

Address _____

SU 9

FILESIXTY

**EAST LONDON
EXCLUSIVE**

ZX81 RAM-PACKS FLAP

and when RAM packs flap, programs crash because of edgy connectors (so children! keep off!).

Now East London Robotics offer a unique product:-

TRADE IN YOUR ZX 81.

Introducing the **MAXIMEM ZX81**. A ZX81 with 32k or 64k RAM fitted **INSIDE** the case (children come back!)

MAXIMEM ZX81 – the most affordable 32 or 64k micro in the world.

MAXIMEM ZX81

32k-£39 PLUS ONE USED
1k ZX81

64k-£59 PLUS ONE USED
1k ZX81

The MAXIMEM 32 and 64k is a modified ZX81 and not just a RAM pack. We give a six month guarantee on the computer, regardless of the age of your trade-in ZX81. The extra memory uses only a quarter of the power consumption of a 16k plug-in memory, and does not interfere with any standard add-ons, such as printers, RS232 or other interfaces.

Trade in your ZX81 by post or over the counter at our premises. (Phone first to check current delivery). Trade-in ZX81s must be clean and in working order. Send and receive the computer only, without manuals, power supplies etc.

SPECTRUM SP48-£23

32k MEMORY EXTENSION

Plug the chip-set (Issue 2) or circuit board (Issue 1 £35) into the sockets provided by Sinclair and you have a standard 48k Spectrum, fully compatible with all Sinclair add-ons and very low in power consumption. No soldering is required. Fitting and removal are easy. The SP48 carries our full warranty and is upgradable on a part-exchange basis to the SP80 for £28.

SPECTRUM SP80-£46

PAGED 64k MEMORY EXTENSION

Fitting, power consumption and add-on compatibility are identical to the SP48 (Issue 1 version £50). It can be used as a standard 48k, but software instructions can switch to a second page of 32k. Although not recommended for the complete beginner, the SP80 is of tremendous benefit to the serious user.

Fit and Test Service: At our premises £3
By registered post £7

ZX SLOWLOADER £10

Loads ZX81 tapes into your Spectrum. A recent letter describes it best.

Dear Sir, Just a line about your excellent Slowloader.

I bought it because I was nearing the completion of a project which uses practically everything in 16k RAM including a string array (DIM 629,7) which took 4 hours hard graft to bash in. I really did not fancy doing it all again.

SLOWLOADER twice found a tape-loading error. So I SAVED again onto a short, high-quality tape – and this time it went straight in. Two minutes to take out the SLOW and FAST lines, 10 to renumber the PEEKs and POKes, 20 to add some colour and a few BEEPs, and the thing was ready to SAVE again. What a little masterpiece!

STOP PRESS NEW 80K PROGRAMS

For Spectrum with SP80. Enquiries on 01 474 4430. We regret our 48K to 80K part-exchange service is available only to SP48 owners.

All products on this order form are in stock at the time of going to press.

Same day dispatch for phoned Access  and Visa  orders.

To East London Robotics Ltd. Please send by return (tick items required).
£ p

☐ MAXIMEM 32k. (£39 + ZX81)

☐ MAXIMEM 64k. (£59 + ZX81)

☐ SP48 (Issue 1 £35) (Issue 2 £23)

☐ SP80 (Issue 1 £50) (Issue 2 £46)

☐ SLOWLOADER £10

☐ Free Catalogue (SAE only)

Postage _____ 65p

I enclose a cheque/PO for
My Access/Visa number is

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Name _____

Address _____

SU3

TRICKSTICK

A revolution in computer games control, for one to eight players simultaneously. See our demonstration at the 8th ZX Microfair on 20th August at Alexandra Palace.

**EAST LONDON
ROBOTICS**
GATE 11. ROYAL ALBERT DOCK. LONDON E16.
24 HOUR INFORMATION SERVICE TEL: 01 471 3308
24 HOUR ACCESS AND VISA ORDERING TEL: 01 474 4715
SPECIAL ENQUIRIES TEL: 01 474 4430
TELEX 8813271 GECOMS

Electric car is now closer

TWO MAJOR STEPS have been taken by Sir Clive Sinclair towards fulfilling his ambition of manufacturing the first mass-produced electric car. He has negotiated an option on the De Lorean car plant at Dunmurry, Ulster and has created a new company, Sinclair Vehicles Project.

Sinclair Research is quick to point out that this is Sir Clive's venture and has nothing to do with it. The new company has taken complete control of the car manufacturing idea.

The team which runs the company says that De Lorean's former factory would be ideal for manufacturing. It is one of the most advanced plants in the country and has the proper assembly-line equipment to produce the electric car. It contains equipment for plastic welding, which would be ideal.

Sir Clive has talked to the Industrial Development Board of Northern Ireland about the use of the facilities at Dunmurry.

Ally is pally

THE EIGHTH ZX Microfair is to be held at Alexandra Palace, London on August 20 from 10am to 6pm. The previous show at that venue in June was the most successful to date. It attracted more than 8,500 people, according to organiser Mike Johnston, compared to the show held last August which attracted almost 7,000 visitors.

Johnston expects an even bigger attendance at the next show and hopes that the Microdrives and RS232 will be on display.

Advance tickets can be obtained from Mike Johnston, ZX Microfair, 71 Park Lane, Tottenham, London, N17 0HG.

Knighthood for Clive

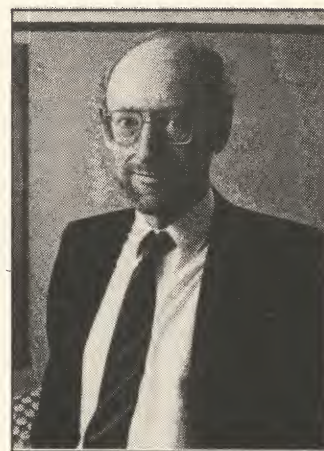
SIR CLIVE SINCLAIR received a knighthood in the Queen's birthday honours. He continues to be a leading figure in the world of computing and microelectronics and his company has sold more than one million computers world-wide.

At present his company is developing a flat-screen television and an electric car.

The names for the honours list are submitted to the Queen by the Prime Minister, who selects outstanding

figures in industry and the arts. Margaret Thatcher is known to be an admirer of Sir Clive's enterprising ability. She presented the Japanese Premier with a Spectrum on her tour of Japan last year.

Sir Clive is very happy about the award and says: "The award of a knighthood is a truly great honour and one I value very highly. It was completely unexpected and a wonderful surprise. More than ever I feel committed to achieving success, in and for Britain."



SIR CLIVE SINCLAIR
'Truly great honour'

Telesoftware gets security device

A NEW SECURITY system has been introduced on Micronet 800, the database system to which users of microcomputers can link by telephone.

The system will enable Micronet to select which software can be listed or copied once it has been downloaded on to a user's computer.

It will mean that some programs can be run on a computer, such as the Spectrum, but cannot be SAVED. Robin Wilkinson, a spokesman for Micronet, says:

"Users will be able to download a game on to a Spectrum by telephone but will not be able to LIST it or COPY it on to tape. It will be like paying 20 pence for an arcade game every time you want to play it. When you switch off the computer the game will be lost."

Several software companies are interested in putting software on to Micronet but will not consider such a move until some form of protection is given.

One such company is Silversoft and Douglas Berne, a spokesman for the company

says:

"We would not consider putting software on to Micronet unless we could be given a guarantee that the software would be protected."

Chess prize

INTELLIGENT Software and Sinclair Research are offering a prize of £5,000 to the first person who can write a chess program to beat the Cyrus-IS Chess in a series of games.

Sinclair Research has acquired the game recently for its Spectrum software library. The program is based on Cyrus chess which won the second European Microcomputer Chess Championship.

Its features include cursor movement of pieces, replay and take-back options and the ability to function as a normal two-player game board. A spokesman for Sinclair Research says:

"We have made no plans for matches yet. We are waiting for people to contact us."

National club run ends

THE NATIONAL ZX Users' Club, run by Tim Hartnell, has been disbanded after two years of operation. The reason, according to Liz North, an organiser of the club, was "because of the rising number of computer publications on the market." Another reason was that the club was providing difficulties for the organisers because of its size.

The club used to send a magazine, *Interface*, to its members but because of the number of machine-specific computer publications on the market recently, *Interface* no longer served a useful purpose. North said:

"*Interface* was the first specialist magazine for Sinclair computers. Now *Sinclair User* and *ZX Computing* have started and our magazine is no longer as useful as it was."

The club had a membership of thousands. The members were informed of the closure by a letter in *Interface* and those who still had outstanding subscriptions were offered books from a range of *Interface* publications.

● **Sinclair User Club offer for former ZX Users' Club members, page 9.**

JRS finds a winner

THE JRS AWARD for Programming has gone to David Prigmore of Alverston, Derbyshire. The winning entry was a ZX-81 game called **Star Defence** which JRS Software is marketing.

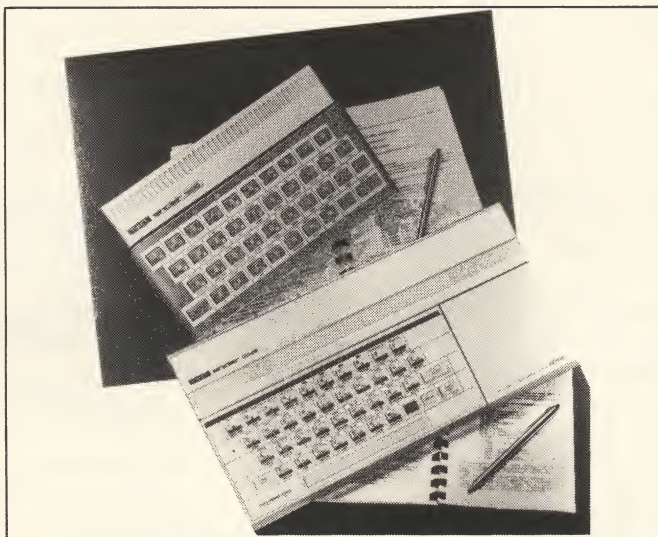
Its author is studying for A levels which include computer science. He hopes to enter the computer industry when he leaves school. John Stubbs of JRS says of the competition: "We were looking for games, utility and business programs. *Star Defence* was by far the best piece of software submitted."

Home coursing

COMPUTER COURSES with a difference are being held in and around Western-super-mare. The courses are given by Dr Roger Stenner and can be taken at the home of the student or at a centre.

Group or individual tuition is available and fees range from £4 to £7.50 an hour. For more information, 0934 417606.

Timex reveals upgrade plans



TIMEX has revealed its plans for two new microcomputers, the 1500 and 2048, in the States. The specifications of the new computers were shown for the first time at a computer show in Chicago.

The 1500 will be an upgraded version of the TS-1000, the U.S. version of the ZX-81, which has attracted some criticism in the States.

The upgrade will have a keyboard which resembles that of the Spectrum.

Unlike the ZX-81, the 1500 will have 16K RAM as standard and an extra 32K RAM module can be fitted to provide 32K. A software cassette, similar to the Horizons tape which is included with Spectrums, will be supplied with each package.

The TS-2048 is the Timex version of the Spectrum. The specifications show the machine to be slightly superior to the Spectrum, although nobody has yet been able to benchtest it.

There are extra commands on the machine according to the specifications. They include FREE, which usually checks memory size; STICK, to control two joysticks; ON ERR, to cope with errors in a program without making it crash; and SOUND, which is like BEEP in every respect except that the volume can be controlled.

The computer is longer than the Spectrum and seems to incorporate a cartridge port into which ROM cartridges can be slotted. No firm release date has been given for the machines but it is hoped that they will appear by the end of the summer.

Software sold on hard disc

SEVERAL RECORD companies have moved into the software business by including microcomputer programs on their latest record releases.

The move was started by EMI when it produced a single called *Camouflage*, while side B contains the ZX-81 programs. A spokesman for EMI says: "You could say that the state of play at the moment is healthy. We have had a very encouraging response from dealers."

Another computer single has been released by record company Mainframe. It has put programs on side B of the disc. The programs on the record are for the ZX-81, Spectrum, BBC microcomputer and Apple II.

Genetic Records Ltd has put a Spectrum program on to a new album, called *XL1*, by Peter Shelley. The program needed five months to perfect and will work on a 48K Spectrum.

The album was released in June and features 10 musical tracks as well as the program. The graphics displayed on the screen by the computer are synchronised with the music.

One difficulty which has arisen about the use of the records occurs when people try to record the computer tracks on to tape using a stereo system. The reproduction of computer programs using stereo is not good because of phasing problems. It is recommended that only one channel of a stereo is used and the other should be turned down.

EMI says that no complaints have been made about reproduction difficulties, although no information about the use of the computer tracks has been given on record sleeves. The company will, however, be examining the problem closely.

Spectrum Top Ten

Program	Last Month	Company	Memory
1 Flight Simulation	1	Psion	48K
2 Jet Pack	—	Ultimate	16K
3 Penetrator	3	Melbourne House	48K
4 Transylvanian Twr.	9	Shepard	48K
5 The Hobbit	2	Melbourne House	48K
6 3D Tanx	—	d'Ktronics	16K
7 Ah Diddums	—	Imagine	16K
8 Horace Goes Skiing	5	Psion/Mel House	16K
9 Arcadia	—	Imagine	16K
10 Hungry Horace	7	Psion/Mel House	16K

ZX-81 Top Ten

Programme	Last Month	Company	Memory
1 3D Monster Maze	2	New Generation	16K
2 Flight Simulation	1	Psion	16K
3 Chess	4	Psion	16K
4 QS Scramble	6	Quicksilva	16K
5 Galaxians	3	Artic Computing	16K
6 Space Raiders	7	Psion	16K
7 Alien Dropout	—	Silversoft	16K
8 Avenger	10	Abacus	16K
9 10 Games for 1K	—	J K Greye	1K
10 Catacombs	5	J K Greye	16K

Compiled by W H Smith

The Cheapest Rampacks In The World

Available Now

ZX SPECTRUM 32K RAMPACK

Simply plugs into user port at rear
of computer and increases your
16K Computer instantly to 48K

£39.95

- Fully Compatible with all accessories.
- No need to open computer and invalidate guarantee.
- Why send your computer away and wait weeks for upgrade,
- Fully cased, tested and guaranteed.

ZX81 16K RAMPACK £19.75

ZX81 64K RAMPACK £44.75

Now make your Spectrum talk!

The Cheetah "**Sweet Talker**" just plugs into the back of the computer using the existing power supply. Fully cased. Easy to program any word, sentence or phrase.

Simply incredible at **£34.95**

All Units: Fully Cased and Guaranteed. Secure No Wobble Design.
Fully Compatible with all accessories.

PRICES INCLUDE VAT and P&P. *Delivery normally 14 days.*
Export orders at no extra cost.

Send cheque/P.O. Payable to:—
Dept SU

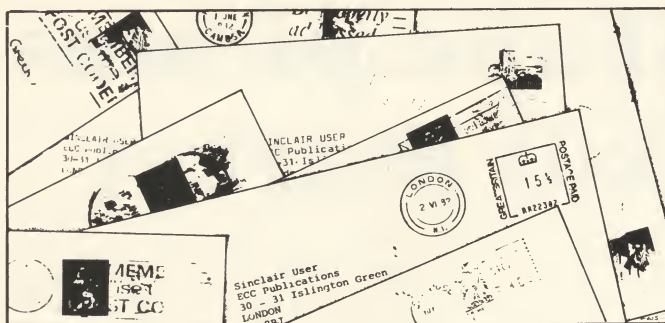
CHEETAH

MARKETING LTD
359 THE STRAND
LONDON WC2R 0HS
Tel: 01-240 7939
Telex: 8954958

16K ZX 81 Rampacks and 32K ZX Spectrum
Rampacks now available at larger branches of

John Menzies





Picking out variables

THE FOLLOWING tip may be useful. I at any rate had not realised the particular capacity of Sinclair Basic in question until recently. The ZX-81 is able to read a variable name out of a string and then evaluate the variable; and that may enable instructions to be passed to subroutines more compactly.

For example:

```
100 LET A$="DGH"
110 GOSUB AS 900
```

```
.....
100 LET A$="XHY"
320 GOSUB AS 900
```

```
.....
900 LET T=VAL
  A$(1)**VAL A$(2)+VAL
  A$(3)
```

```
910 RETURN
```

This saves several lines, each time the subroutine is called, over the alternative

```
100 LET A=D
110 LET B=G
120 LET C=H
130 GOSUB 900
```

```
.....
300 LET A=X
310 LET B=H
320 LET C=Y
330 GOSUB 900
```

```
.....
900 LET T=A**B+C
910 RETURN
```

**R W Sharples,
London NW7.**

The bug search goes on and on

I READ with some interest the letter in the June issue about the bug in Hungry Horace — one which we discovered in January. I thought you may be interested in a bug in the Psion Planetoids which enables one to amass a limitless score without losing any ships.

Shoot all the asteroids except one and then manoeuvre the ship into the top right corner of the screen. With care, it is possible to position the ship so that a small piece appears in each corner. That, coupled with the fact that the ship seems mysteriously to turn yellow in that area, makes one immune to destruction. It is possible to fire from all corners of the screen.

Our high score using the technique stands at slightly more than 224,000. Also the

game does strange things when pressing thrust and hyperspace simultaneously; try it. Surely it is possible to test games thoroughly for severe bugs like this?

**James Randall,
Surrey.**

I WRITE with reference to Ben Beavell's letter in the June issue. I own a 16K Spectrum and have the Hungry Horace cassette. To get out of the third maze, you go straight to the right, waiting for the park-keeper, then go round that section until it is safe to escape to the top. My best score is 1,000,030. It took more than an hour. I also have the Space Raiders cassette and my best score is 10,070.

**Nigel Power (15 years),
Oswestry, Shropshire.**

Drawing-in more critics

I AM WRITING to give my support to J Johnson, whose letter in the June issue criticised the illustrations which accompany the program listings.

It is easier to assimilate information if it is in a pleasant format, you say, but I am afraid that, like Johnson, I find nothing attractive about this particular format; it simply irritates me as it serves no useful purpose, adds nothing to the program listing, and wastes space which could be put to better use.

Also, I fail to see how a program listing without the comic characters and silly remarks would be impossible to enter. All that is really required is an interesting, well-written program printed with clarity and accuracy.

The present style of presentation may appeal to a minority of readers, perhaps to some of those in the under-16 age group. You should, however, bear in mind the results of the survey in your March issue which showed that only 29 percent of your readers are in that particular age-group, so please have some consideration for the rest of your readers.

Incidentally, why not conduct another survey asking readers what they like and dislike about *Sinclair User*? I think I have already made it clear what I dislike most. As for my favourite part of the magazine, that is undoubtedly the Andrew Hewson column, for which two pages are not sufficient. If all the space saved from the comic bits were given to Hewson, then *Sinclair User* would be worth twice the price.

**J A Burgess,
Knutsford, Cheshire.**

J JOHNSON'S letter in the June issue concerning the

"space-wasting stupid illustrations" is something with which I disagree. I and probably many others think the illustrations are a very good idea, although they could be smaller.

The user-defined graphics program in the same issue is probably a very good program but it wastes a whole page. The illustration takes 50 percent of the page and the program the other half. The page is wasted because everyone who has a Spectrum has the Horizons tape by Psion and on that tape is exactly the same program.

Please make illustrations smaller and think about whether programs are worth inclusion or whether everybody has them.

**Philip Stanton,
London NW11.**

Quarts into pint pots

I OWN A 1K ZX-81 and look forward to your publication every month. I have noticed in the last few months that some of the programs for the 16K ZX-81 will work on the 1K. That is mainly because, when compiling the programs, various byte-saving techniques have not been used, e.g., SGN PI to equal 1 or not PI to equal 0 and so on.

So much so that the following programs, from your June issue, will in fact run on the 1K — Heavens Above, Codes, Space Supplies and Paranoid. Users of 1K should not give up because of a small memory. Check the listings of the 16K programs and re-write them slightly, maintaining all the important information.

**David Hambly,
Ilford, Essex.**

Tight fit is better

I WISH to reply to Chris Powell's letter in the May edition. I do not know what he means by 'the misuse of the Basic language'. First, any use other than as an introduction to computing is strictly a misuse and, second, misuse or otherwise, I found it very useful.

It has improved my programs because I can fit in much more. His saying the tips are bad habits is ridiculous, because anything which improves programs can only be good and so long as the inexperienced programmer knows what he is doing, nothing can go wrong.

I do not agree that the ZX-81 is 'cheap and easy' to expand to 16K. I had enough trouble getting the ZX-81. You have only to look at *Sinclair Programs* and the program pages in *Sinclair User* to see how many 1K ZX-81

owners there are.

Simon Brunning,
London SW17.

Programming blind

READERS may be interested to learn that there is a way of programming the Spectrum without showing the listing.

The blanking-out of the listing can be achieved by having as the line in one's program:

1 inverse video PRINT true video " " ENTER (Then Edit)

When the line has come back for EDITING

1 true video CAP/SHIFT 8 once inverse video PRINT " " ENTER

One will notice that on the edited version, when using inverse video just before the PRINT statement, a beep can be heard, which means it is operative.

D S J Crompton,
Bristol.

Random expansion is not repeated

I AM SURE many readers will have found Andrew Hewson's solution to Stephen Maltby's problem — April issue — useful and educational. Unfortunately Hewson stuck to the strict terms of Maltby's problem of picking five random whole numbers between 1 and 10 without repetition and so restricted the elegance of what might have been a much more comprehensive routine.

Anyone who tried Hewson's routine would have found it impossible to use for more than 50 percent of solutions. I would be pleased if you would publish my solution which will randomise all whole random numbers from 1 to N without repetition.

The principle is to make a

selection initially from N possibilities. This value, a (r) is put to the "back" of the array, in place of a (n) which is stored temporarily as S; a (r) can then be replaced by what was A (n) on the second pass through the loop contained in lines 50 to 90, a selection is made from n=r possibilities which is exchanged with A (n-r) and so on. The important difference from Hewson's solution is the progressive restriction of choice, as previous selections are 'stacked' from back to front of the array "a". Hewson attempts to make all elements of the array interchangeable which can obviously only be 50 percent successful.

Tony Rickwood,
Ilford, Essex.

Tape pirates kill market

HAVING OWNED a Spectrum for several months, I feel that I must write on the topic of illegal tape copying. Since buying a Spectrum, I have encountered only a few fellow-users and more than several of them have offered to copy any tapes I would like for my own use.

If that small cross-section of users is typical of users nation-wide, I feel that something should be done to suppress the illegal activity.

The video industry has already experienced pirate videos and it seems that the software industry has a similar fate in store. The video industry has already taken steps against illegal copiers — heavy fines and imprisonment — and I hope those actions will not be necessary in the software industry.

Copiers must realise that what they are doing is not only illegal, contravening copyright, but also is killing the industry from which they are feeding. They are stealing from software houses and from the original writer, who will have spent many hours perfecting a program and will expect to profit from such work.

Problems not exceptional

T LAYCOCK, of Fleet — letters June, — is not one-in-a-million. I have just returned my Spectrum, which failed to work with 48K programs despite spending a month at W H Smith's service department. My neighbour had three machines, all failing, and in disgust bought a BBC micro which works perfectly. I shall try once more but if that one fails — goodbye Sir Clive.

J Grabnar,
Bromley, Kent.

In most cases, only about £5 is saved on each tape in the short run and, compared to the prices of some tapes for games computers, such as Atari, which often cost £30, it seems a small price to pay for games which are often excellent and offer such enjoyment.

So I appeal that next time you see a game which appeals to you, instead of breaking the law by obtaining a copy, often of very poor quality anyway, spend a small sum and buy from a legal source.

J H Fletcher,
Wirral,
Merseyside.

Signals from space

HAVING JUST become a 16K Spectrum owner and being a licensed radio amateur I would like to know if any of your readers has any idea or suggestion of how to achieve programming of computer-enhanced signals from deep space? I am thinking the easiest might be to enhance CW Morse signals.

On another front, having just obtained a printer, it strikes me that it must surely be usable as an ordinary recorder, such as for temperature, and a host of other applications where a record has to be kept of voltage or resistance changes — ECG, EEG, observations in plant physiology spring to mind.

An instrumentation amplifier would be required and the motor would have to be speed-controlled. I wonder has anybody done any work on this, such as doctoring the O/P or the Spectrum.

H H C Graepel,
Kinsale, Co. Cork,
Ireland.

"BY FAR AND AWAY THE BEST MAIL ORDER FIRM FOR SOFTWARE"

(M. Pankhurst Cranleigh)

SOFTWARE SUPERMARKET

All we do at Software Supermarket is play every Spectrum/ZX81 program we can find, pick out the very best and offer only those to our customers - in our ads and our catalogues.

From over 30 countries you write, praising our free selection service (it's impartial, too: we produce no programs ourselves). You say we save you plenty - in postage and mistakes.

And we're quick. *We usually send your order out on the same day we get it.* Faulty tapes, if any, replaced at once.

OUR NEW CATALOGUE IS OUT NOW. Here's a few - the best of the new, the all-time greats. Free catalogue with every order. You've got a great computer: we've got the great programs.

Mail order only, please. If we had to run a shop, we wouldn't have time to run all the programs.

48K SPECTRUM ONLY

TRANSYLVANIAN TOWER

"Enthralling and addictive" (PCW). An excellent game at a reasonable price" (PCN). Stunning 3D graphic adventure. Fight (and shoot) your way through the 500 3D rooms in Count Creepie's castle. Combines adventure and arcade games with great skill. We can't give it up! (R. Shepherd) £6.50.

TEST MATCH *"Amazing 3D animated graphics. Watch'em bowl, hear and see them bat, watch the fielders run!"* Choose your own teams, or use the England/Australian teams in the computer. Clear on-screen instructions. And ONE DAY CRICKET on the 'B' side, too. (CRL) £5.95.

BLACK CRYSTAL *"An excellent graphics adventure" (S. User).* The massive 180K of program, 'loads' from 2 cassettes in 6 chapters. You must solve each of the 6 stages to defeat the Lords of Chaos. Real-time monster battles, 16 command keys. Instruction manual. (Carnell) £7.50

THE HOBBIT *"Takes first place for quality and value for money" (S. User) "A marvellous game...should set the standard" (ZX Comp).* Free 285 p illustrated book contains clues to help you. 30 beautiful full-screen pictures; 500 word vocabulary; 16 page instruction manual: it took 4 people 18 months to write! (Melbourne House) £14.95

RESCUE *"Excellent...the best adventure game I have ever played" (PCN)* 20 page clearly written on-screen manual leads you to very ingenious 3 stage adventure. Four skill levels. Full information on screen plus a map when you need it! Great fun. (CRL) £5.95.

TRADER *"Great fun...much more entertaining than the usual adventure" (Your Computer).* Great spaceships, pretty maps, animated graphics - a big adventure that loads in 3 parts. *"Outstanding" (P.C.T.).* (Quicksilver) £9.95

PIMANIA *"Amusing and brilliant...the graphics are excellent" (S. User).* A wonderfully witty adventure, great graphics and music and you could win the £6,000 Golden Sundial of Pi. (Automata) £10.00

ANY SPECTRUM

LET 'E.T.X.' TALK TO YOU *The clearest speech we've ever heard. "Must be at the limit of the Spectrum's capabilities" (HCW).* Enchanting graphic adventure: 16 landscapes: 1400 power zones: 4 levels: 16-page on-screen manual: up to 9 players. ETX will run in 16K, but without speech. Use keyboard or Kempston/AGF joystick. (Abbex) £5.95

FROGGY *The best frog there is, we reckon. This game uses so much memory, you even have to unplug your printer. Loads in 2 parts. As you get better, the game gets harder. Just great. (DJL) £5.95*

JUNGLE FEVER *Escape down the pigmy death-run. Smashing full-screen animated graphics as you leap raging waterfalls, swing on a rope across deep pits, dodge spiders and poisoned blow darts. Good sound, too. On-screen lives, score, hi-score with name, time left. Some of the best graphics we've seen. (A&F) £6.90.*

MONSTERS IN HELL *Can you dig fast enough to escape from the Mad Monk's monsters? Vampires, followed by ghouls, clones, demons and more chase you successively up and down above the very realistic flames of Hell. Very exciting game. (Softek) £5.95.*

JET-PAC *"Good graphics, with many small touches that put this program well ahead of the pack" (HCW).* Control your test pilot spaceman with his jet-pack as you build your spaceship, fuel it up and take off for a new planet. All the time avoiding the nasties and collecting treasure! Wonderful! 1 or 2 players. Keyboard or Kempston joystick (Ultimate) £5.50.

HEATHROW *Air Traffic Control. If you've outgrown your flight simulator, get in charge at Heathrow. Land your planes safely using your radar and stack displays. Watch out for rogues. 7 skill levels, including demo. (Hewson) £7.95*

WINGED AVENGER *"Hard to beat" (CVG). "One of the best Sinclair games so far" (PCW).* Very fast 'PHOENIX', 7 play levels, 3 attack waves, laser shield: mothership with smart bombs. A best-seller. (Work Force) £4.50

3D TANX *Shoot the enemy tanks from your moving 3D turret. 3 play levels: accurate ballistics: 1 or 2 players: pause: demo game: training program: even plays God Save The Queen. (DK tronics) £4.95*

FAUST'S FOLLY *The first adventure we've seen that's worth playing in 16K. It's great and it's graphic! Loads in 2 parts: clear instructions: then a smashing adventure with directions, inventory, look, score, save. (Abbex) £5.95*

ZX81 OWNERS

Special 16K ZX81 versions of 5 of these programs are available. Use the coupon to order. Free 12-page ZX81 only catalogue with order or phone for catalogue only.

BLACK CRYSTAL	£7.50	WINGED AVENGER	£4.50
TRADER	£9.95	FROGGY	£5.95
PIMANIA	£8.00		

CHARGE PROGRAMS TO ANY VISA CARD CALL 01-789 8546 (24 hours)

To: Software Supermarket, 87 Howard's Lane, London, SW15 6NU.

If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number (SU9)

I own a 16K Spectrum ☐ 48K Spectrum ☐ 16K ZX81 ☐ (please tick).

I enclose my Cheque/PO for £..... payable to Software Supermarket. Please use block capitals. If we can't read it, you won't get it.

Name

Address

Postcode

Phone, if any, in case we have a query

Program Name	Computer	Price
		£
		£
		£
		£
		£
		£
POSTAGE	U.K. Add 55p only per order	£0.55p
AND	EUROPE. Add 55p for each program	£
PACKING	OUTSIDE EUROPE. Add £1 for each - program airmail.	£
TOTAL		£

Meet the



with Artich Software

1. INCA CURSE

(Adventure B)

In a jungle clearing you come across an ancient Inca temple. Your mission to enter, collect the treasure and escape alive! But beware!

£5.95 for 16K ZX81 and £6.95 for 48K Spec.

2. SHIP OF DOOM

(Adventure C)

You are unavoidably drawn to an alien cruiser. Can you reach the control room and free yourself? Or will they get you first? Cassette £5.95 for 16K ZX81 and £6.95 for 48K Spec.

3. PLANET OF DEATH

(Adventure A)

You find yourself stranded on an inhabited alien planet. Can you reach your ship and escape? £5.95 for 16K ZX81 and £6.95 for 16K/48K Spec.

4. ESPIONAGE ISLAND

(Adventure D)

While on a reconnaissance mission your plane loses control and you are forced to land. Can you survive and escape with the island's hidden secret? £5.95 for 16K ZX81 and £6.95 for 48K Spec.

5. INVASION FORCE

A popular arcade game for the 16K/48K Spectrum.

Fires through the force field to destroy the menacing alien ship. Sounds easy? Two levels of play normal or suicidal. Full colour. Sound and hi-res graphics. £4.95 for 16K/48K Spec. £3.95 for 16K ZX81.

6. NAMTIR RAIDERS

High speed, quick action invaders-type game with four separate groups of attackers. £3.95 for 16K ZX81.

7. INVADERS

Planet earth is once more being invaded. You must fight to the death to protect your planet. Thirty-six levels of play. £4.95 for 16K/48K Spec.

8. GALAXIANS

Swooping attackers, explosions, excellent graphics and personalised scoring. £3.95 for 16K ZX81 and £4.95 for 16K/48K Spec.

9. COSMIC DEBRIS

You find yourself in an alien asteroid belt. To survive you must blast the asteroids to powder... before they get you! £4.95 for 48K Spec.

10. ZOMBIES/ SWORD OF PEACE

Prove you are worthy of becoming the Monarch of Oz, by finding four objects of state

against tremendous odds.

As the only survivor on a desert island you have to escape from man-eating Zombies. £5.95 16K ZX81.

11. GOBBLE MAN

Escape from munching ghosts to eat power dots and then gobble up the ghosts. High speed classic game with hi-res graphics and sound. £4.95 for 16K/48K Spec. and £3.95 for 16K ZX81.

12. GALAXY WARRIOR/ STAR TREK

Galaxy Warrior - Destroy all the Klingons in the Galaxy and exit through a black hole into a new Galaxy. Star Trek - You have 15 star-dates and your mission is to destroy 7 Klingons. £5.95 16K ZX81.

Artich for all your Sinclair ZX81

challenge



PUSH YOUR SINCLAIR TO THE LIMIT

Artic supply the best selection of adventure, arcade and educational games available for the Sinclair home computers. Artic also offer a wide range of utilities that will enable you to utilize your ZX81/Spectrum to its full potential.

These include:

16K ZX81 Assembler	£9.95
48K Spectrum Assembler	£9.95
Toolkit	£5.95
Spec Bug	£6.95
ZX Bug	£6.95
SYS 64	£6.95



ARTIC COMPUTING LIMITED

396 James Reckitt Avenue, Hull, North Humberside

Cheques and P.O. made payable to Artic Computing Ltd.
Dealer Enquiries Welcome. Please state whether your
order is for ZX81 or Spec.
Send S.A.E. (9" x 6") for Catalogue.
(Access. Barclaycard welcome.)



13. 3D COMBAT ZONE

Drive your tank through a 3D landscape destroying enemy super tanks, flying saucers and avoiding the pyramids.
£5.95 for 48K Spec.

14. 1K GAMES PACK

A superb selection of 11 games to stimulate your mind for the 1K ZX81. Only £4.95.

15. 3D-QUADRACUBE

Can you outwit the computer with this original version of 3D noughts and crosses? £4.95 16K/48K Spec.

16. 1K ZX CHESS

An incredible 1K chess game
ideal for someone who wants a
quick game without waiting for
loading.
Only £2.95 for ZX81.

17. SPECTRUM MICRO CHESS

The first chess program for 16K/48K Spec. Allows all legal moves, castling; en-passant and pawn promotion. Full colour and graphics display. £6.95.

18. ZX CHESS II

A great game of chess for your 16K ZX81 or 48K Spec. Seven levels of play, analysis and recommended move options. £9.95 for 16K ZX81, £8.45 48K Spec. Voice Chess 48K Spec. £8.95.

To: Artic Computing Ltd, 396 James Reckitt Avenue,
Hull, N. Humberside HU8 0JA.

Please supply

* Cheque for total amount enclosed

[illegible]

* Access/Barclaycard No.

Name

Address

* Please delete or complete as applicable.

/ Spectrum software needs...

EXCITING ADDITIONS FOR YOUR HOME COMPUTER

THE MAPLIN TALK-BACK for ZX81 and VIC20

Now your computer can talk

- ★ Allophone (extended phoneme) system gives unlimited vocabulary.
- ★ Can be used with unexpanded VIC20 or ZX81 — does not require large areas of memory.
- ★ In VIC20 version, speech output is direct to TV speaker with no additional amplification needed.
- ★ Allows speech to be easily included in programs.

Complete kits. Order As:
LK00A (VIC20 Talk-Back). Price £24.95.
LK01B (ZX81 Talk-Back). Price £19.95.
Full construction details in Maplin Projects Book 6. Price 70p. Order As XA06G.

SOUNDS GENERATOR FOR ZX81

3-Programmable tone generators with programmable attenuators turns your ZX81 into a mini-synthesiser.
Noise generator with 3 pitch levels enables the creation of most special effect sounds.
Single address access via BASIC with PEEK and POKE. Connects directly to expansion port socket or motherboard.
Complete kit. Order As LW96E. Price £10.95.
Full construction details in Maplin Projects Book 5. Order As XA05F. Price 70p.

ZX81 INPUT/OUTPUT PORT

Two bi-directional ports for a total of 16 input or 16 output lines.
Includes one buffered output which can interface directly to CMOS.
On board address selection allows for expansion to 6 ports with two boards.
Complete kit. Order As LW76H. Price £9.25.
Full construction details in Maplin Projects Book 4. Order As XA04E. Price 70p.

MODEM

A CCITT standard modem that connects directly to your telephone line via a B.T. approved transformer. Transmits and receives simultaneously on European standard frequencies at 300 baud. May be used to talk to any other 300 baud European standard modem including the Maplin Computer Shopping modem on 0702 552941 and any British Telecom Datel 200/300 Service modem. The modem's computer interface is RS232 compatible.
A complete kit excluding case is available. Order As LW99H. Price £39.95.
Full construction details in Maplin Projects Book 5. Order As XA05F. Price 70p.

KEYBOARD with ELECTRONICS for ZX81

- ★ Full size, full travel keyboard that's simple to add to your ZX81 (no soldering in ZX81).
 - ★ Complete with electronics to make "Shift Lock", "Function" and "Graphics 2" single key selections.
 - ★ Powered (with adaptor supplied) from ZX81's own standard power supply.
- Full details in Project Book 3 (XA03D). Price 70p
Complete kit (excl. case) £21.90.
Order As LW72P.
Case £4.95. Order As XG17T.
Ready built-in case £29.95.
Order As XG22Y.



ZX81 TV SOUND

ZX81 sound on your TV set.
Video reversing switch for normal or inverse video display. Can be used with the Talk-Back or Sounds Generator kits.
Complete kit. Order As LK02C. Price £19.95.
Full construction details in Maplin Projects Book 6. Order As XA06G. Price 70p.

ZX81 EXTENSION BOARD

Our ZX81 Extendiboard plugs directly into the ZX81 expansion port and will accept a 16K RAM pack and three other plug-in modules simultaneously. Parts are sold separately as follows:
PCB Order As GB08J. Price £2.32.
Edge Connectors (4 needed) Order As RK35Q. Price £2.39 each.
Track pins (1 pack needed). Order As FL82D. Price 85p per pack of 50.

INTERFACES for MODEM

Interfaces for most popular home computers which do not have RS232 ports will be available shortly. An interface for the ZX81 that includes a complete Machine Code Communications Program is available. Order As LK08J (ZX81 Modem Interface Kit). Price £24.95.
Full construction details in Maplin Projects Book 7. Order As XA07H. Price 70p.



MAPLIN

Maplin Electronic Supplies Ltd., Mail Order: P.O. Box 3, Rayleigh, Essex SS6 8LR.
Tel. Southend (0702) 552911 (Sales).

159-161 King St., Hammersmith, W6. Tel. 01-748 0926. 284, London Road, Westcliff-on-Sea, Essex.
Tel. (0702) 554000. Lynton Square, Perry Barr, Birmingham. Tel. (021) 356 7292.
All prices include VAT & carriage. Please add a 50p handling charge to orders under £5 total value.

Spectre has good electronic drawing power

good Electronics drawing program for the 48K Spectrum. It contains all the symbols to allow you to design a digital or analogue circuit and COPY it on the printer. There are 62 symbols and each covers the area of one print square.

The program or circuit on its own may be SAVED to tape to allow you to resume at any time where you left off. An interesting feature is that the program can activate the circuit. That checks and indicates the path of the 0V and the power supply round the circuit. It does not give voltages but checks for continuity, using the symbols as gates through which the current will or will not flow.

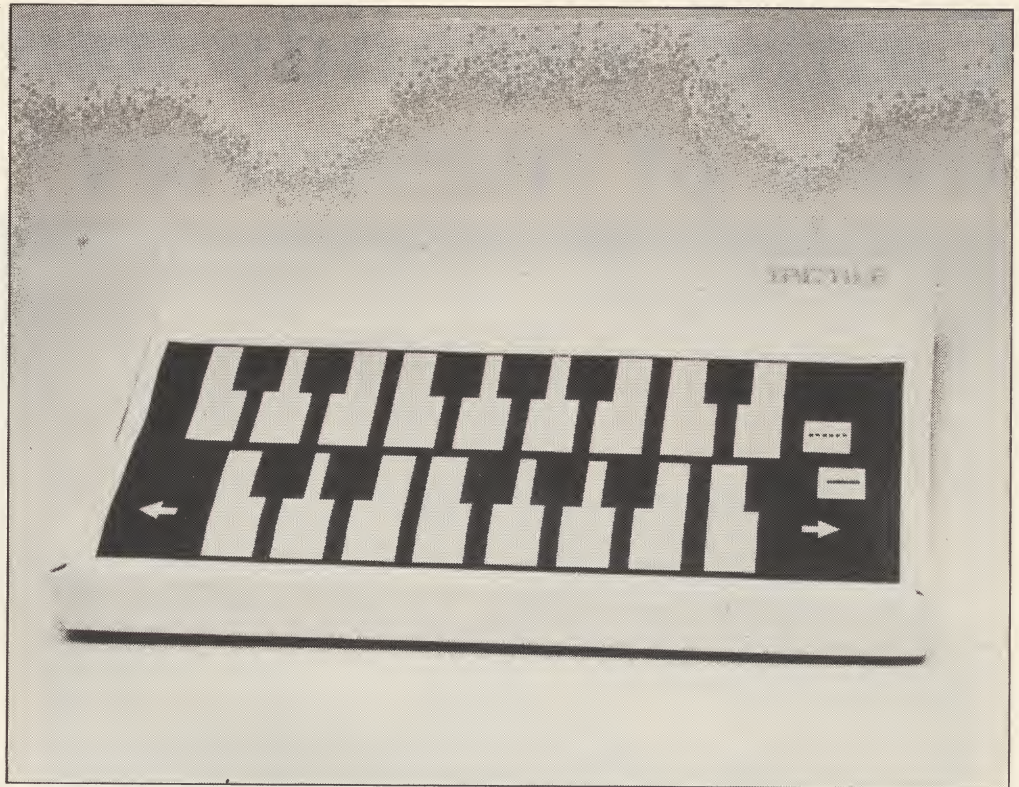
The supply current flow is shown in red and the 0V connections in green PRINT squares.

It is very slow — five to 10 minutes — but it can give a good indication if you have omitted some part. All the character set is re-programmed so if you BREAK the program you might find the listing a little difficult to follow.

It is a very useful program which could be enhanced with machine code to improve its abilities.

Electronics is the name of the program and the Spectre agent is at 2 Mull Close, Oakley, Basingstoke, Hampshire. The Spectre head office is in Hongkong.

Electronics will be sent anywhere in the world air-mail at a cost of £6.95 and includes a money-back guarantee and technical advice.



Educational keyboard eases understanding

A VERY USEFUL device for young children is a Tactile keyboard which fits over the Spectrum keyboard. A plastic cover with a flexible

top, the Tactile keyboard allows you to design a layout to fit a program.

Being a flat sheet, pictures or numbers can be placed

over certain sections of the keyboard, so that children can be asked to "press the PEAR" and the like. The keys pressed can then be checked to see if the correct response has been given.

A piano keyboard is supplied already fixed to the keyboard and children find it fascinating as well as educational.

Programming tips are included so that a range of keys may be checked using Basic or machine code. Designs are made easier by the fact that a clear film can be used with overhead projector pens to trace pictures of objects direct from books and magazines. Early Learning Opportunities is producing software using the keyboard and a tape with a piano and a typewriter program is available from Tactile at £92.95. It is an important device for teaching children to use a computer. The keyboard costs £99.95 from Tactile, Wraith, 32 Elmfield, Kingswood, Bristol BS15 2SS.

Monitored tape copying made easy by Jiles

JILES ELECTRONICS has produced a tape copier which allows you to make back-up copies of software. It does not require a computer to use it but allows the computer to check what is happening by LOADING the program at the time it is being recorded.

The device consists of a black plastic box with three sockets containing an amplifier and a battery.

The input socket is connected to the ear socket of the tape recorder and the output socket to the MIC of the second tape recorder. The LOAD socket is connected to the computer if required.

The volume is set at half on the tape recorder with the program in it and normal on the recorder. The recording process is then started with the computer monitoring the signal.

The tapes tested on the Spectrum and ZX-81 versions worked very well. Advice is given on how to align your tape recorder head and there are helpful hints if it does not work. The device is called the CO-DER and costs £99.95 from Jiles Electronics, 48 Parkway, Chellaston, Derby DE7 1QA. Tel: 0332 703892.

Camel expands its store of memories



THE CAMEL range by Cambridge Microelectronics has been expanded by three new ROM-type packs for the ZX-81. ROM-81 allows you to plug-in up to 8K of EPROMs into the two sockets provided — 2716 or 2732 types.

The memory area covered is selected by soldered straps inside the black plastic box.

The Dream 81 has 64K of RAM plus an EPROM socket which will take up to 16K of EPROM — 27128. The EPROM replaces the RAM between 8K and 16K on the memory map and permits the use of the slower 450ns EPROMs.

The 16K of the 27128 is split into two 8K areas switched in and out by a switch inside the pack, which makes it a little awkward as it is under the cover and not removable when using the machine.

The Cramic is a bigger version of the Memic (16K) which resides in parallel with the 16K RAM on a ZX-81. It can be used to capture and retain any 16K program. Used in conjunction with a 16K RAM pack it allows you to restore a program in seconds. The Cramic is bank-switched by a software I/O output instruction to ports 16 to 31.

The control of switching and copying of memory to the Cramic is done by a small machine code program in a REM statement at the beginning of each program and must be typed-in or run in from TAPE before using the pack.

The Passport program allows you to use the Cramic as a second program, switching between that and the original. Spare memory in another location will be required to swap variables between pro-

grams. The Cramic is housed in an 8½in. × 1in. × 3in. black box which is attached to the ZX-81 by a flexible ribbon cable. An expansion connector is also provided at the back for the RAM pack.

The RAM consists of 6116-type memories backed-up by a lithium battery. The cover has two switches; SEL brings in the Cramic during a program and ON allows the Cramic to be put in parallel with the existing 16K RAM so that any program typed-in may be 'captured' by just de-selecting the Cramic. Unfortunately that crashes the program in RAM but re-inserting the machine code will bring it back as good as new.

The Cramic costs £91.95, ROM-81 £17.20 and the Dream-81 £80.45 from Cambridge Microelectronics Ltd, 1 Milton Road, Cambridge CB4 1UY. Tel: 0223-314814.

Processing the words

HILDERBAY has produced for the Spectrum a printer interface as well as software to run it, including a mini word processor. The black box has 23-way printer plug on the front and a ribbon cable of up to one metre ending in the usual Centronics-style plug. The box has no extender PCB, so any add-ons such as Microdrives must go between that and the printer interface.

The software is a Basic program and a small piece of machine code. The Basic program allows you to set up a series of options which are then incorporated into the machine code.

TASWORD can have the printer software inserted so that it uses another printer instead of the ZX printer.

The options on most printers are different but they can offer underline, emboldened or enlarged text using the graphics characters re-programmed to give control characters.

A COPY software routine is also included but not using the COPY command. All other commands are by the use of LLIST or LPRINT. There should be no need to go inside the printer to set up the CR/LF options as they can be set from the software.

It is a very good combination of hardware and software at £45. Hilderbay Ltd, 8-10 Parkway, London NW1 7AA. Tel: 01-485 1059.

Audio action

COMPUSOUND, which produces the audio modulator for the ZX-81, Spectrum and other computers is taking action against Kayde for allegedly copying its Telesound 84 which has a patent pending. The Kayde module first appeared at the Midlands Computer Show in April.

Modem allows ZX-81s to speak to each other

MAPLINS has two kits of interest to the ZX-81 user and both can be used to provide an on-line 300-baud modem. The first, which is the modem, was issued as a kit in February, but until now the RS232 and the software was not available to use it.

The important thing about 300-baud working against Prestel is that it is used commercially to obtain information from databases for which you have to pay a fee and also you can communicate with other computer users who do not have ZX-81s. Free databases or bulletin boards are also available; a list of them can be obtained from the Association of Computer Clubs.

The modem is not the easiest of kits to build as it uses a five-band resistor colour code

but if you follow the instructions to the letter the kit can be assembled without too much difficulty. The problem is in setting-up the modem and connecting it to a telephone line.

To set up the modem an oscilloscope is essential, except that it is difficult to set up accurately. Most of the controls can be set up using a sensitive voltmeter but to check the mark space ratio the modem is best looped back to itself and, using the RS232, sending Us until Us return on the screen.

Having set up the modem, a plug and socket must be ordered from British Telecom to connect it to the line. Once connected to the telephone line, you can telephone Maplins and order components, check your item

is in stock and if you are using a credit card, pay for it.

The RS232 kit is much easier to build but you will require a motherboard and at least 2K of RAM to run the terminal program — the program to talk to the modem. The software is stored on tape and conversion is made to ASCII characters by using an EPROM. The RS232 can also be used to run a printer or to talk to another computer which has an RS232.

The RS232 interface cannot produce negative voltages, so full implementation of the standard is not possible.

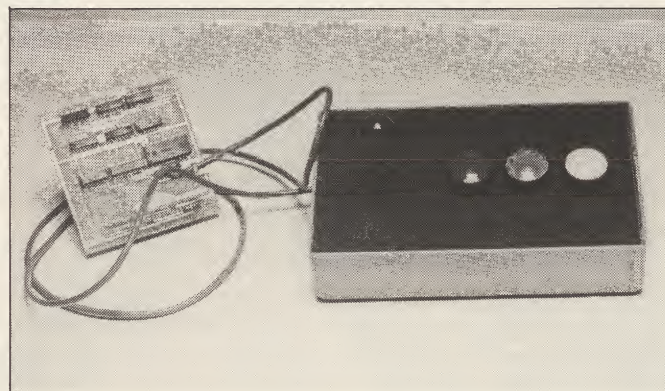
The modem costs £40.45, RS232 interface kit £25.45, motherboard £8.45, modem case £7.85. Maplins is at PO Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702-552911.

Programming a joystick

ELECTROTECH has produced a large box containing a programmable joystick and three large push-buttons. In appearance it looks very similar to the large games machine controls. A printed circuit board which contains a 2K RAM plugs into the back of the Spectrum. It is used to store the information on what keys to operate when the joystick switches are operated.

There are eight positions on the joystick as the corners also operate both switches. Whether that will be useful or confusing will depend on the game. All the micro-switches are large professional types which should last a long time. That also explains the cost of the joystick, expensive at £43.70 for the standard model.

A tape which accompanies



the joystick is a Basic program which allows you to program the joystick and SAVE the results on to tapes as a machine code file.

It allows you to re-load the key combinations for a game without the slow process of the Basic program.

The keyboard is not affected and can be used as well as the joystick for entering the

score. Seven functions can be programmed — three switches and a four position joystick.

The cost might suit some shops which wear out joysticks very quickly but there seem to be cheaper alternatives for the average user.

Electrotech is at 2 Heath Close, Winston Hill, Luton, Beds. Tel: 0582-429809.

Tidying spectrums

THE PRINT 'n' Plotter console is a cardboard stand for the Spectrum, printer and power supply. The console arrives packed flat and can be constructed easily into a solid, vinyl-covered box in about half an hour. The instructions are clear and simple and there is an alternative of housing four tapes instead of the printer. Cutouts are provided at the back for tape and TV power supply and a ventilation slot under the Spectrum heatsink. It is necessary to tidy-up with a black felt-tip pen on the corners where the vinyl has been cut. Those edges could also be covered with adhesive tape to prevent them wearing.

The only disadvantage seems to be that no peripherals will fit directly into the Spectrum except the printer because of the $\frac{3}{4}$ in. distance between the computer and edge of the console. Modifications, however, can be made with a sharp knife.

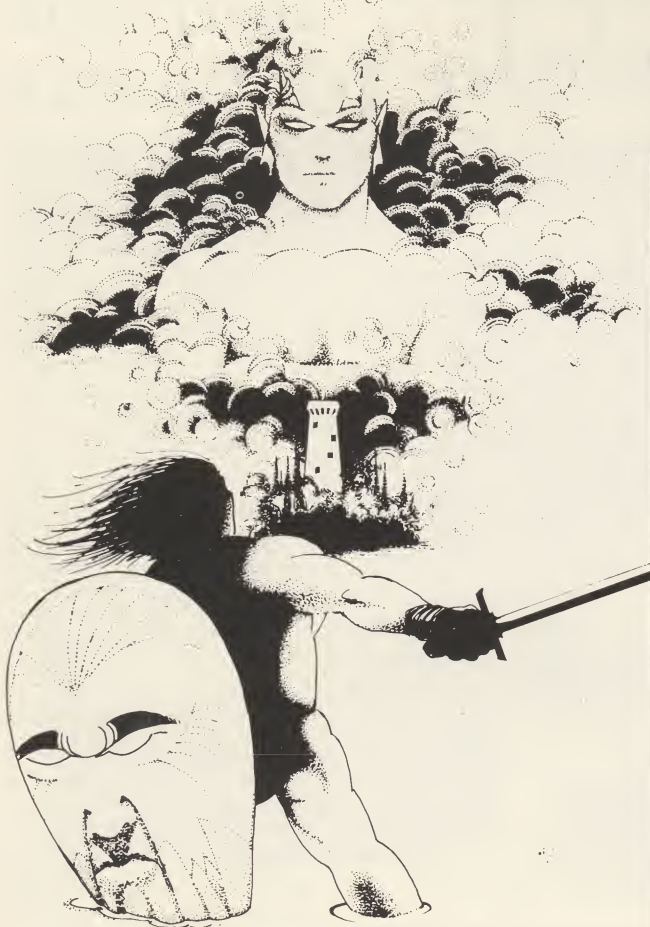
It is an inexpensive box into which you can put your Spectrum; it tilts it to the correct angle for typing and allows the power pack to be stored inside. By raising the height a slim tape recorder can also be put inside the box.

Print 'n' Plotter consoles cost £8.25 from Print 'n' Plotter Products, 49 Borough High Street, London SE1 9SE.

Controller

KEMPSTON Microelectronics has produced a conversion tape for six of the most popular games which allows you to convert the game for use with its joysticks. It has also included a machine code version of COPY in the latest release of software for the printer interface, called by a USR command.

SPECTRUM 48K : ZX81 16K SIX PART ADVENTURE



BLACK CRYSTAL THE QUEST IS ABOUT TO BEGIN

The ultimate role-playing adventure for the SPECTRUM/ZX-81. You can become a warrior, elf or wizard on a quest to find and use the rings of creation: to destroy the Black Crystal and defeat the Lords of Chaos. Held within six programs lies a land of fabulous treasures and mythical monsters. Journey through the land of Beroth, explore the castle of shadows, descend into the Shaggoths lair, search for diamonds in the sea of sand but beware of sand sharks! Confront the fire demon in his temple, battle against the Lords of Chaos and win your way to the Black Crystal.

By splitting Black Crystal into six programs we can provide more variety and detail than any other adventure for the Sinclair computers.

Real time monster battles. Superb graphics. Save game feature. All six parts are supplied together on cassette, boxed with instruction booklet.

**SPECTRUM 48K: 180K OF PROGRAM
IN SIX PARTS — ONLY £7.50**
**ZX81 16K: OVER 100K OF PROGRAM
IN SEVEN PARTS — ONLY £7.50**
**WHY PAY MORE FOR LESS OF AN
ADVENTURE**



To: **CARNELL SOFTWARE, DEPT 2, 4 STAUNTON RD, SLOUGH, SL2 1NT.**
Please send me: Black Crystal for my,

Spectrum 48K £7.50
ZX81 16K £7.50

I enclose a cheque/ postal order (payable to Carnell Software) for £

NAME

ADDRESS

TRADE ENQUIRIES WELCOME

MICROSPHERE

MICROSPHERE COMPUTER SERVICES LTD
72 ROSEBURY ROAD · LONDON N10 2LA
TELEPHONE 01-883 9411

EVOLUTION (48K Spectrum)

Can you trace the course of evolution from the primordial soup to man, keeping a balanced world and surviving the odd disaster as you go?
Should be easy... after all it's been done before!

Only **£6.95**

OMNICALC (48K Spectrum)

The best Spectrum spreadsheet you can buy. Written in machine code to be faster, to give you more space for data, and to allow more features to be included, it is guaranteed uncrashable.

"If more programs shared the quality of OMNICALC, then we might see more Spectrums in offices."
Home Computing Weekly 3/5/83

"It is ideal for someone who has just found the spreadsheet concept, but it is also a very powerful tool for anyone who has used one previously."

Sinclair User June 1983

Complete with comprehensive manual **£9.95**

ZX-SIDEPRINT (Spectrum & ZX81 versions)

Use ZX-Sideprint to print sideways, giving you 80/132 etc. characters per line.
(State version reqd) **£4.95**

CREVASSE & HOTFOOT (any Spectrum)

Can you make it across the ice-cap whilst chasms open and close all around?
Or, help the rabbit get to fields full of carrots — but remember! the plumper the rabbit, the greater the danger.

2 original games for only **£4.95**

NEW!

THE TRAIN GAME (any Spectrum)

NEW!

First there were model railways, then there were computers. Now Microsphere gives you both in one.

Featuring passenger, goods & express trains; tunnels; viaducts; points; stations; turntable bonus games; collisions; derailments; irate passengers; and everything else you expect from a major railway!

Two track layouts on each cassette. Superb value for money.

Only **£5.95**

SOFTWARE LIBRARY FOR SPECTRUM

Low cost weekly hire of the best arcade games, adventures, utilities, languages and business programs.

- Membership only £6.00 for 12 months.
- Program hiring from only 80p (plus 25p p&p).
- Free fully descriptive catalogue for members.
- New titles constantly being added.
- Purchase new programs at discount prices.
- Return of post service.
- All tapes despatched using first class post.
- We have full permission and licences from the leading software publishers, to whom royalties are paid.

Compare these features with our competitors and you will see why more Spectrum owners are joining the Kernow Software Library. Join today by clipping the coupon below or send a S.A.E. for further details.

☐ YES, please send me my free catalogue and selection sheet. I enclose my £6 cheque/Postal Order.

NAME

ADDRESS

.....

..... TEL

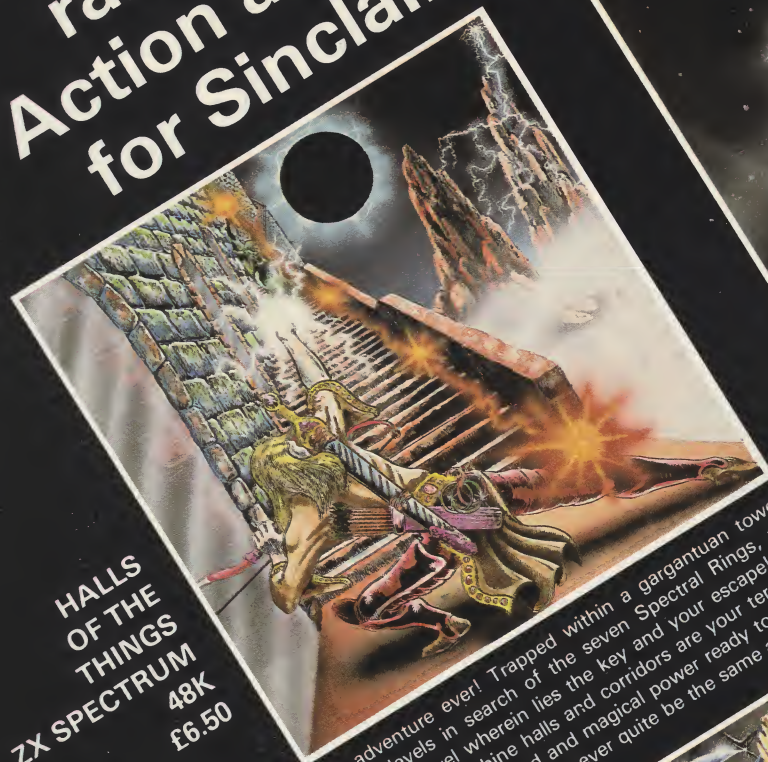
Send to:

KERNOW SOFTWARE LIBRARY

(Dept. SU)

55 ELIOT DRIVE, ST GERMAN'S
SALTASH, CORNWALL PL12 5NL

A new and exciting range of Arcade Action and Adventures for Sinclair Computers



HALLS OF THE THINGS
ZX SPECTRUM 48K
£6.50

The first **TOTALLY ANIMATED** graphics adventure ever! Trapped within a gargantuan tower your task is to meticulously explore its many levels in search of the seven Spectral Rings, the possession of which allows access to the dungeon level wherein lies the key and your escape! But beware... doomed for all eternity to wander the labyrinthine halls and corridors are your terrifying humanoid adversaries—The Things—creatures of incredible speed and magical power ready to stretch your mental and physical agility to the limit! After Halls, your life will never quite be the same again...



THE DUNGEON MASTER
ZX SPECTRUM 48K
£7.50

The first adventure to enter into the true spirit of traditional role-playing games.
"I have been a dungeons and dragons fan for several years... The package provides excellent entertainment for all fans of the cult and should prove a good introduction to the game".
Sinclair User



MERCHANT OF VENUS
ZX81 16K
£5.50

A stunning real-time graphics simulation putting you in control of a leviathan space freighter plus a complex economic scenario combine to produce an exciting game to test your skill and head for business!

ZX81 Games Pack "Brilliant"... Interface "Excellent"... Sinclair User £4.50
Four great arcade games plus a challenging adventure. All written in 100% machine code to run in 1K
ZX81 Monitor and Disassembler £7.50. "Well written and useful machine code utility"... Your Computer

Dealer enquiries welcome. Written any software? Send it to us for evaluation and details of our excellent royalties scheme.
P & P included. Please make cheques PO's payable to



Crystal
Crystal Computing
2 Ashton Way
East Harrington
Sunderland SR3 3RX



COSMIC GUERRILLA
ZX SPECTRUM 16K OR 48K
£5.50

Bring your Spectrum to life with the fastest, meanest and most colourful arcade action around. Your task is to zap the relentless waves of alien attackers as they obliterate the force field protecting your supply of ion laser cannons.
KEMPSTON JOYSTICK COMPATIBLE

ZX MICROFAIR

Where else can you see so much
for Sinclair Computers?



ONCE AGAIN AT ALLY PALLY THE BIGGEST SHOW OF ITS KIND ANYWHERE IN THE GALAXY!

What Computer Exhibition gives you the opportunity of finding everything (and we mean *everything*) for ZX Computers?

Where can you find more than 150 exhibitors dedicated to Sinclair enthusiasts?

Where on Earth can you discover new and original products — hardware, software, books peripherals, programs, add-ons — many additions launched at the show?

Where can you find plenty of space to move, eat, drink, relax and, of course, buy?

Where will you discover that special 'show offer' on the equipment you have been promising yourself?

Where will you find an exhibition hall with so much parking space — and in parkland too?

And what other exhibition offers you all this for only £1 entrance fee (50p for kids under 14)?

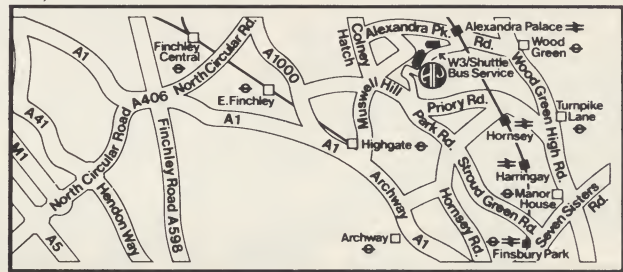
There's only one answer:
**THE 8th ZX MICROFAIR AT
ALEXANDRA PAVILION
SATURDAY 20th AUGUST 1983.**
Make a note of it now. . . and come along for a good day out!

**The big show
for a quid
(or less)!**

CUT OUT AND KEEP

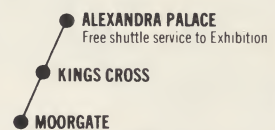
By Road

Follow signs from the A1 (Links with M1 and North Circular). Plenty of parking space available! Variety of routes from Central London.



By British Rail

From London (Kings Cross or Moorgate) — about every 10 minutes to Alexandra Palace station — free shuttle bus or short walk from there!
From any part of the U.K. enquire from Kings Cross Travel Centre, London N1 9AP (phone 01-278 2477) about special day trips to the ZX MICROFAIR!



By London Transport

Underground: Victoria Line from Victoria (also Oxford Circus, Kings Cross/St Pancras) to Highbury and Islington — change (cross platform) to BR Suburban Service to Alexandra Palace — free shuttle bus or 5 minute walk from there!



Alternative: Piccadilly Line (from Heathrow etc) to Finsbury Park or Wood Green — Link with W3 bus service to the fair.

HEATHROW

8th
ZX MICROFAIR
ALEXANDRA PALACE,
SATURDAY 20th AUGUST 1983

SATURDAY 20th AUGUST 1983 AT ALEXANDRA PAVILION, ALEXANDRA PALACE, WOOD GREEN, LONDON N22. FROM 10am TO 6pm. Advance tickets available from: Mike Johnston, (SU) 71 Park Lane, Tottenham, London N17 0HG. Adults £1.00. Kids (under 14) 50p. Parties of 10 or more at 20% discount! Please make cheques/P.O.s payable to ZX MICROFAIR and enclose S.A.E.

EXHIBITORS! Call Mike Johnston now on 01-801 9172 for details of space at this and future shows!

LIST . . . LOAD . . . RUN . . . OR . . . DIE . . .

VERIFY . . . ENTER . . . ATTACK . . . RESTORE . . .

INVERSE . . . THRUST . . . MOVE

GOSUB . . . BEEP . . . BREAK SPACE

TAKE UP THE CHALLENGE

SILVERSOFT

Design by Tim Epps ©

ARMAGEDDON(S)*

The cities are crumbling under the continual attack waves. As defence controller you will be obliterated with them. Unless...

MISSION IMPOSSIBLE(S)*

Space mines, force fields, meteor storms and lethal enemy ships conspire to stop you reaching the astronauts stranded below, but... you have to return them to the mother ship in one piece!

EXTERMINATOR(S)*

Robot intelligence has surpassed humans*, using homing missiles, move and fire in eight directions, avoiding indestructible robots with homing missiles, to save the last of the human race.

MUNCHER(S)

Maze, race and chase game. Munching gets harder as you progress. Arcade pills, random mazes, blue ghosts and smooth arcade action.

SLIPPERY SID(S)*

Take Sid on a sneaky trip, eating frogs and magic mushrooms, but watch out, if he hits the garden wall he'll be sick. Hi-scoring, 5 skill levels.

STARSHIP ENTERPRISE(S)*

Starship simulation, save the galaxy, intriguing adventure with arcade action. 3D Hyper-warp, real time Alien attacks, over 30K of machine code and BASIC (48K only).

GROUND ATTACK(S)

In the labyrinth the flesh eating aliens have been located, penetrate their defences, destroy fuel supplies and missile silos. 9 skill levels, many effects.

CYBER RATS(S)*

The meanest metallic menaces to march across the screen, moving so fast they're almost a blur. Hi-res movement, Hi-score bonus.

BRAIN DAMAGE(S)*

The master computer detects you patrolling its circuits in your proton-panzer. Defend yourself against 3 types of electron panzers or escape through the hyper gate to another circuit. 3 skill levels.

ZX81

Ground Attack £3:95
Super Wumpus £3:95
Games Pack 1. £3:95

Graphic Golf £3:95

SPECTRUM

Exterminator £5:95

Cyber Rats £5:95

SPECTRUM

Slippery Sid £5:95

Starship Enterprise £5:95

Muncher £5:95

Ground Attack £5:95

Mission Impossible £5:95

Brain Damage £5:95

Armageddon £5:95

I enclose cheque/postal order for:

£ _____

Name _____

Address _____

Send cheque or postal order to: SILVERSOFT LIMITED
London House 271/273 King Street, London W6
or complete your
Access or Visa No. _____

*Joystick option available.

Teaching aid is impressive

THE NUMBER of educational programs for the 16K ZX-81 is growing but there is still room on the market for good-quality programs such as **Spelling Bee**.

When the program is run the ZX-81 displays a very detailed picture of a bush, a hive and a hyperactive bee which flies between them. The student is then asked to select the spelling.

The first level is the easiest. You are asked to name objects which appear on the screen. The computer starts with a bee and continues by displaying pigs, trees and even a gate.

The second level is slightly more difficult. The computer

asks you to spell five-letter names. If you have most of them correct the computer displays a birthday cake with candles glowing on the top.

The difficulty level increases although the same pictures are shown but the computer highlights a part of the picture and asks you to name that part. It could be the arm of a chair or the wing of a bee.

Spelling Bee uses very impressive graphics and is ideal for a young child learning to spell. The package is produced by Image Software, 185 Elm Road, New Malden, Surrey KT3 3HX. It costs £5.



Spaced-out collection

ALIEN RAIN and **Out-raider** are two games on one cassette for the 16K ZX-81. In **Alien Rain** you control a little man at the bottom of the screen. Home is at the left of the screen and the object of your quest lies at the right, in a cave.

The little man must run from the left to the right, rescue an alien, and return home. Points are gained for the number of aliens rescued.

The only obstacles endangering the little man's mercy mission are thousands of evil invaders which rain from the heavens. If you are hit by one a life is deducted from the three lives allowed at the beginning of the game.

At first you are protected by three shields which the invaders destroy slowly. Those defences will give you time to rush backwards and forwards, rescuing as many aliens as possible.

The game runs at nine levels; the ninth is fairly slow but the first is very fast.

The graphics are impressive and even the title pages have been designed for the best effects.

The second game on the cassette is **Outraider**. It is your job to protect the grey area in the middle of the screen. To do so you are given a spaceship which can be rotated to face the assaults of enemy craft which are out to destroy the grey area.

When the main hull of the mothership has been penetrated and an enemy ship has sent a missile into the grey area the game is over.

The concept of **Alien Rain** is original and the game is fast. It is something which can be played again and again. **Outraider** is interesting as you need to use only one key control to play. The games have a quality about them which would attract even a Spectrum owner.

The cassette is available from Computer Rentals Ltd., 140 Whitechapel Road, London, E1. It costs £3.50.

Good but may perhaps be late

IT IS UNFORTUNATE that **Maze Guzzler** and **Super Breakout** have been released so late, as they are both good games. Putting any traditional game on to the 1K ZX-81 is still an occupation pursued by some software houses but there are so many copies of **Breakout** and **Pacman** on the market already that software houses should concentrate on something more original.

Maze Guzzler is the **Pacman** game on this tape. It includes all the usual features of fairly intelligent ghosts, energy pills and on-screen scoring.

The maze is put up at the beginning of the game but you have to press the RUN key to start the ghosts and your guzzler moving around the maze. You have four chances at clearing the mazes of the life-giving dots. If you manage to stay in the game for long enough you will find that the action becomes fas-



ter. The ghosts seem to be dopey at times but they usually get the guzzler in the end. The game on the other side of the cassette is called **Super Breakout**. It consists of bouncing a ball against a brick wall and the bricks fall out as they are hit. If you

miss the ball on its return you lose one of your four lives.

Maze Guzzler and **Super Breakout** will give hours of fun to people who have 1K ZX-81s. The cassette costs £3.50 from Selec Software, 37 Councillor Lane, Cheadle, Cheshire.



New firm crashes in

YOUR SPACESHIP crashes on to a forbidding planet, damaging your propulsion and navigation systems. To obtain the Grittan Stones, necessary to have those systems working again, you must enter the robots' city.

In the city are evil robots which will try to kill you, using large magenta balls to smash you to pieces. The green robots are the King Tobors, indestructible killers which you cannot defeat.

Tobor is a game for the 16K and 48K Spectrum from a new company, Elfin Software. The player moves round a succession of mazes, outwitting and destroying the robots which are in pursuit. You can use your laser gun only when on the move and can fire only in the direction in which you are running. When you die the robots are kind enough to erect a tombstone with RIP on it at the place where you fell.

Elfin certainly is a company to watch as, judging by its first game, it is keen to produce top-quality software. One small reservation we had about the game, however, was that the instructions and title pages were loaded in sections and that took a long time. A player does not want to have to watch two or three minutes of graphics before playing the game every time it is loaded.

Tobor is available from Elfin Software, Hudsons House, Battery Road, Great Yarmouth, NR30 3NN. It costs £5.95.

Halls of Things could be a danger to health

HALLS OF THINGS for the 48K Spectrum is a game which could change the Spectrum games scene overnight.

The program is technically excellent and dangerously addictive, although you can forget about high scores until you become adept.

You play a little man who must rush up and down the stairs to different levels of a maze in which several magic rings can be found. The problem is that some little space invader-type creatures are out to get you with their fireballs and lightning. You can fight them with your fire-

balls, lightning and sword. You can also heal the wounds which have been inflicted on you by using magic, of which you have a limited amount.

The screen display makes it even more impressive. It looks as if the game is running on an Apple 2E or UK-101, both computers more expensive than the Spectrum. The game is bound to be a hit apart from one criticism. **Halls of Things** has no sound. The fights between Things and the hero could be made even more dramatic with the addition of lightning zaps or explosions.

Cosmic Guerrilla is an arcade game which is also produced by Crystal Computing for the Spectrum.

You have three spaceships to save and, depending on how far you proceed in the game, the aliens mutate from ordinary space invaders to cosmic pigs. The sound and graphics combine to make the game good fun and easy to play. **Halls of Things** costs £6.50 and **Cosmic Guerrilla** £5.95. Both cassettes can be obtained from Crystal Computing, 2 Ashton Way, East Herrington, Sunderland, SR3 3RX.

The world comes to visit

IF YOU HAVE a Spectrum and you want to know about far-off places you may never have to pick up a gazetteer because of a new database package called **Countries of the World**.

The program, for the 16K and 48K Spectrum, centres on an incredible high-resolution colour drawing of a

world map. The countries can be listed and scrolled through backwards and forwards.

Each country has a code number and by referring to that number you can access its statistics, general information and a graphics representation of its position on the globe.

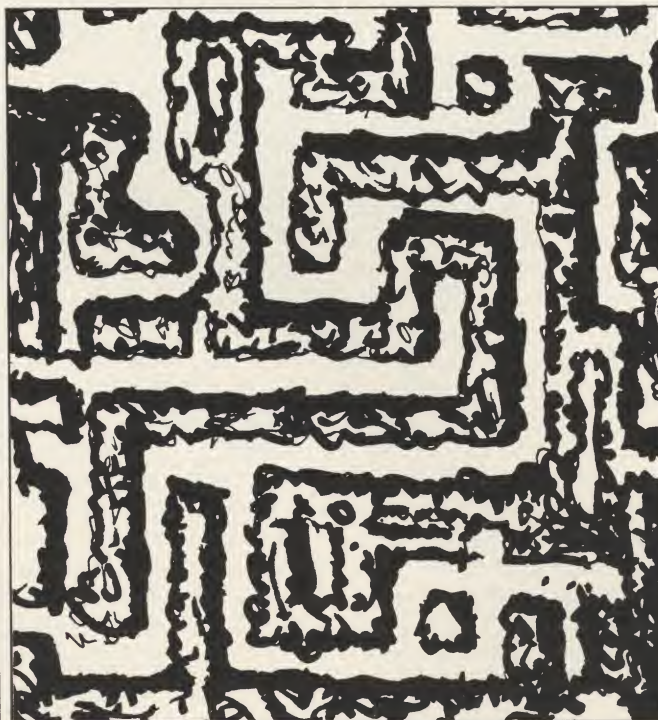
The detail in the program is very fine but some points made about countries are inaccurate. For instance, the program gives the capital of Andorra as Andorra-La-Viella, where it should be Andorra-La-Vella. Little mistakes like that spoil the program.

Another new release is **Maze Chase**. The program is in the Pac-man mould but is very addictive and difficult to play.

The manufacturer says the game has four mazes on the 16K version and 12 on the 48K. We have managed to get through only the first few mazes as the game is so difficult.

The player must eat the energy pills and lemons while staying away from the evil guardians. If a magic strawberry is eaten the guardians will lose their power and you can eat them.

Maze Chase and Countries of the World are available from Hewson Consultants, 7 Graham Close, Blewbury, Oxon. Maze Chase costs £4.95 and Countries of the World £5.95.



Cracking the EGG is no joke

WHEN YOU HEAR that the universe is being threatened by a giant Ectogenetic Galactic Gamate — EGG to all you intelligent people — you may decide to catch the next bus out of the Universe.

In **Spawn of Evil**, however, a new game for the 16K Spectrum, you decide to fight and promptly put your spaceship into attack mode. Your job is not only to destroy the EGG before it becomes indestructible but also to kill all the Pulsoids, Cycloids and Aliens which breed from it.

The software is in two parts and each part can be run independently.

Your spaceship glides through a 3D representation of outer space where waves of spawn dart across the screen. We found it extremely difficult to hit anything.

The controls of the spaceship can be changed to meet your requirements but the speed at which a change of direction is accomplished is so slow that we could not hold many pulsoids in our gun sites long enough to fire a laser blast.

Despite the difficulty of getting used to, **Spawn of Evil** is a well-presented and graphically-impressive package. It can be obtained for £4.95 from dK'Tronics, Unit 2, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ.



Picking clubs at Troon

THERE ARE MANY games of golf on the market but none simulates the rolling greens and deep bunkers of **Troon**. The game is for the

48K Spectrum and provides a graphic representation of the 18-hole championship course. You do not have to be an expert golfer to play it but

making a shot requires slightly more golfing skill than just guessing the co-ordinates of the hole for which you are aiming.

Oiling the wheels ensures success

IF YOU HATE J R Ewing and would like to take over his corporation you will like **Dallas**, a game for the 48K Spectrum from CCS Software.

You are in charge of a new oil company which must make \$200 million in nett assets and \$80 million to take-over Euing Associates. There are three levels of difficulty but at each level you must buy a concession of land, put a moving rig on it, start drilling until you find oil, and then go into production.

To make the kind of money needed to take-over Euing you will have to build production plants on at least three concessions to make sufficient profit. If you do not

you could be bankrupt. As with any good simulation game there are hazards with which you must deal. Tornadoes may destroy your rig, drilling accidents may occur and the taxman may call for very large amounts of cash.

Dallas is an engrossing game and needs several hours' play to complete successfully. It is a game which all the family will want to play as it is guaranteed to turn even the youngest youngster into a megalomaniac who needs a regular dose of power and money in the game.

Dallas can be obtained from CCS Software, 14 Langton Way, London SE3 7TL. It costs £6.

The graphics in the game are cleverly-used and well-produced. When teeing-off the player will see an aerial view of the next hole, along with trees, lakes, green and rough. As the ball gets nearer the hole a close-up view of the hole, complete with flag, is shown.

The range of clubs you can use seems almost infinite and the game gives a list of those clubs on-screens to help you choose which you want to use.

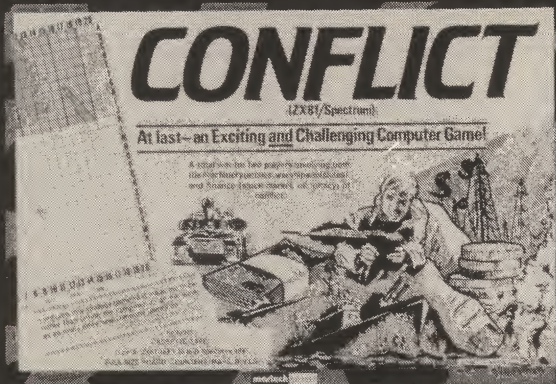
You can let all your friends or family join the championship game to see who is the best player. The game is relatively user-friendly, so you do not have to have a set of golf clubs stored in the cupboard to be able to play it.

Troon is a very complex game and one of the only games of golf on the market which features club selection. It can be obtained from Hornby Software, 21 Pinfold Hill, Leeds LS15 0PW and costs £6.95.

NOW PLAYING

... A SPECTACULAR DOUBLE BILL

SPECTRUM (48K), ZX81 (16K), BBC 'B'
DRAGON 32, COMMODORE 64, ATARI



Continuing for the season
YOUR SELF and **ANNE UTH**
in a fantastic game of

WAR

... a powerful experience ...

... a world on the brink of holocaust!

—a completely unique two player computer moderated board game of cunning and strategy. You will experience all the strain and excitement of having total control of a nations resources and military forces in time of crisis. Will you achieve victory ... or the disaster of defeat!



The latest science fiction EPIC starring
BUG RAMPOKE and **LEN STRING**
in a brilliant game of

UNIVERSAL DESTRUCTION

... mind blowing excitement ...

... a war between two distant galaxies!

—an intense two player computer moderated board game which makes you the all powerful leader of your galaxy's destiny. How quickly can you understand the forces at play—and rid the universe of your enemies presence. Definitely not for the early to bedders!

DONT MISS THEM ...

at your local outlets now!

Version 1: ZX81 (16K)/Spectrum (48K) £11.95

Version 2: BBC 'B'/Dragon 32 £14.75

Version 3: Commodore 64/Atari £14.75

or mail orders (inc. P & P) to our box office:

martech games

Dept SU

9 Dillingburgh Rd., Eastbourne, Sussex BN20 8LY

machine code for your
Spectrum BASIC
ALL-SORT™
simple to use
unlimited power
very very fast
brilliant

Write for literature & stockists:

Alan Firminger

171 Herne Hill London SE24

SPECTRUM & ZX81 EDUCATIONAL SOFTWARE

SPECTRUM FAMILY LEARNING SERIES

Use our Computer Assisted Learning PACKs to help your children with their school work. The programs in the series use moving colour graphics and sound to make learning more enjoyable. Each pack contains four programs and is suitable for use with the 16K or 48K Spectrum. Program notes are supplied.

CALPAC FL1 (5 to 8 years) £7.50
Tens and units addition and subtraction with detailed help facilities; powerful, easy to use drawing program; English comprehension applied to American Indians.

CALPAC FL2 (7 to 10 years) £7.50
Roman history; spelling tester with easy entry of your own lists; flexible table-tester; homophones.

CALPAC FL3 (9 to 12 years) £7.50
Nouns, verbs, adjectives and adverbs; tenses of verbs; biology of the flower; long division tutor.

The programs are ideal for the ages stated, but could be used by anyone requiring revision of these areas of study.

CALPAC C1 O-LEVEL CHEMISTRY £6.50

Four clearly presented revision/tutorial programs. The subject matter has been carefully structured to cover the most important aspects of:

- ★ Elements, compounds and mixtures.
- ★ Structure, bonding and properties.
- ★ Redox, electrolysis and the activity series.
- ★ Acids, bases and salts.

48K Spectrum and 16K ZX81 versions of the cassette are available. Please specify which you require.

Professional Computer Assisted Learning materials from:

CALPAC COMPUTER SOFTWARE

108 Hermitage Woods Crescent, St Johns,
Woking, Surrey GU21 1UF.

Overseas orders £8.50; includes airmail postage.

SIMPLE PLUG-IN CENTRONICS INTERFACE



For ZX
Spectrum

ONLY
£45
inclusive

- Recognises LLIST and LPRINT which allows programs to be listed directly from your Spectrum
- Also allows printout direct from BASIC listings without the need for special user calls
- Completely self contained with 1 metre of ribbon cable and connectors
- Works with any Centronics Interface including all Epsoms, Seikosha 100A, OKI Microline 80 etc
- Includes driving software which allows up to 128 characters per line
- Full range of business software available
- Fully tested and guaranteed for 12 months

Trade Enquiries
Welcome

STOP PRESS

TASWORD TWO - The Word processor, is now available for the Kempston Centronics Interface and gives an amazing 64 characters per line on your screen. This is ideal for standard A4 paper and prints your text just as it appears on your screen. Only £13.90 inclusive



KEMPSTON

MICRO ELECTRONICS

180a Bedford Road, Kempston, Bedford, MK42 8BL

I wish to order:

	Tasword Two	@ £13.90	
	Centronics interface	@ £45.00	
Cheques/Postal orders should be made payable to Kempston Micro Electronics Ltd	Post & Package	FREE	
	Total (VAT inc)		

For Access/Barclaycard please give your card number and signature

Card No _____

Signature _____

Address _____

Please post to Kempston (Micro) Electronics, Dept SU8
180a Bedford Road, Kempston, Bedford MK42 8BL.

New from ...

MIKRO-GEN

SPECTRUM Software

COSMIC RAIDERS (16K) £5,95

You — the only remaining pilot of the "Earth Defence Fleet" — have the daunting task of defending the Earth from attack by alien beings that have already set up a base of their own on earth.

- * Radar Scanner display in hi-res *
- * Full colour and sound effects *
- * From the author of Spectrum 'Scramble' *
- * 100% machine code *



SPACE ZOMBIES (16K) £5,95

Shooting through space you are ambushed by a fleet of Space Zombies flying at you in formation, swooping and diving at you. Destroy them, if you can! But in destroying them, you attract more to the area, and the game gets progressively harder.

- * Full screen hi-res graphics *
- * 1 or 2 players * Joystick option *
- * Full sound and colour *
- * Three playing speeds *



MINES OF SATURN and RETURN TO EARTH £5,95

Mines of Saturn While piloting a routine orbit of Saturn, you are caught up in a radiation storm which forces you into the giant planet's rings. Your energy drained, you make a forced landing on the planet's surface. Luckily you crashed near an abandoned mining base and you set off in search of some di-lithium crystals to refuel your stranded space ship. Can you do it?

Return to Earth Having escaped from your previous dilemmas, you reach Earth Station 1, but fail to make radio contact. You effect a safe if harrowing manual docking. On entry you find it deserted, and the control room destroyed. You must explore the station and find some way to alert Earth of your predicament, but beware, many of the rooms are identical, there is extensive damage, and signs of alien intruders.

(16K) Text Adventure



Graphic Adventure (48K)

MAD MARTHA

£6,95

Poor little Henry is the hen-pecked hero of this domestic tale. One night he can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun. Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table. Just as Henry is getting into his evening his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe. Guess what part you play in this happy tale? That's right, you're Henry. Watch out for that axe!



Access or Visa Card holders

please telephone (0344) 27317 (9am - 6pm)



Please add 40p per order for post & packing

Name _____ Address _____

☐ Cosmic Raiders ☐ Space Zombies
☐ Mines of Saturn/Return to Earth ☐ Mad Martha

MIKROGEN, Dept A3, 24 Agar Crescent, Bracknell, Berkshire, RG12 2BK

Can you face the challenge in the biggest-ever competition for Sinclair users?

Join the fight to be the best Sinclair Programmer. There are thousands of £££s to be won in the contest to find the top software writer of 1983.

CAN YOU FACE the challenge in the biggest-ever competition for Sinclair users? Join the fight to be the best Sinclair programmer. There are thousands of £££s to be won in the contest to find the top software writer of 1983.

In this new competition, the Cambridge Trophy, sponsored jointly by *Sinclair User* and Computer Cases Simulation Ltd, we are searching for the best writers of programs for the Spectrum and ZX-81. We are offering a first prize of £1,000 plus royalties to the person who proves deserving of the title of Winner of the Cambridge Trophy 1983.

The trophy will be awarded annually with a different theme each year. In 1983 the theme is adventure and strat-

egy games. The judges will be looking for a number of factors when making their decision. They include:

- Instructions
- Program documentation
- Graphics and sound
- Playability
- Lasting appeal
- Innovation
- Use of machine.

As well as the first prize of £1,000, which can be won by programs for either the Spectrum or the ZX-81, there will be two second prizes of £250, one for the Spectrum and the other for the ZX-81. Similarly there will be two third prizes of £100. In addition there will be 10 runners-up prizes for each machine, consisting of five CCS programs and a free annual subscription to *Sinclair User*.

Fill in the form for your passport to fame and fortune.

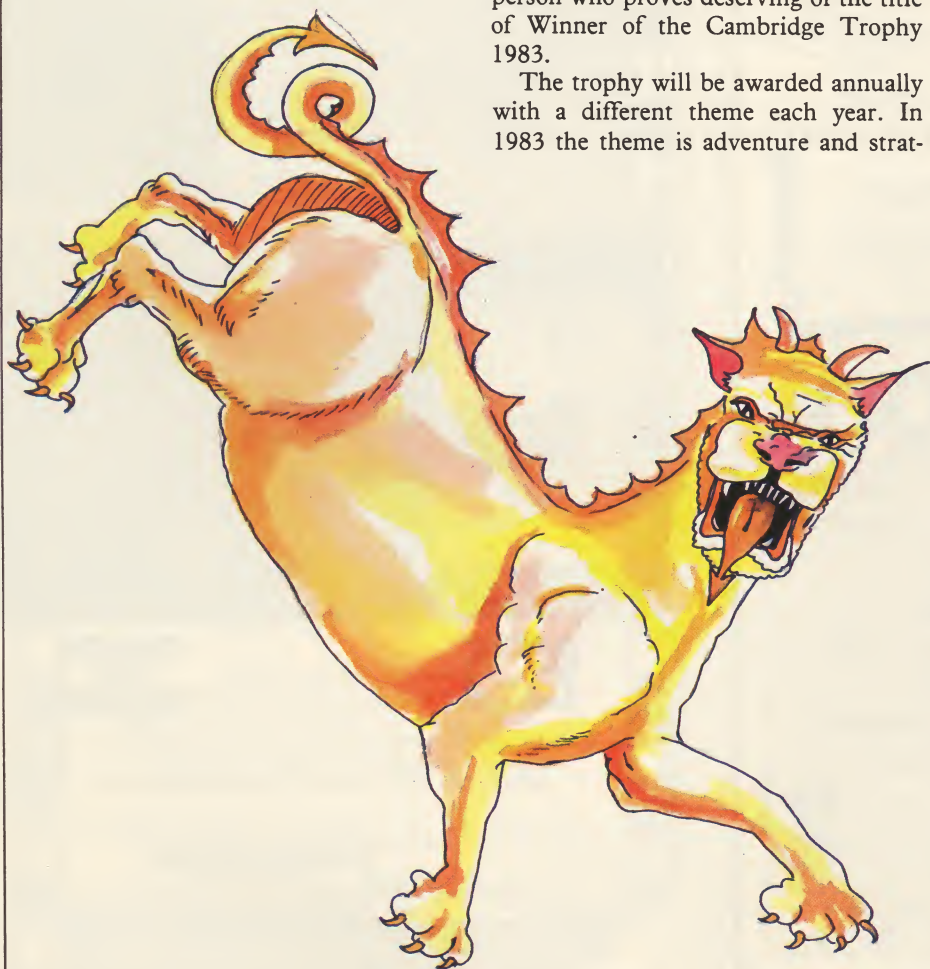
- Entries must be on cassette accompanied by a listing, detailed explanation of the program and an entry form. Entrants must warrant that their programs are original.

- Programs only for the Spectrum and ZX-81 will be considered.

- Entries must reach *Sinclair User* at 30-31 Islington Green, London N1 8BJ, by Tuesday, September 20.

- Results will be announced at the Christmas ZX-Microfair in December.

- The entrant assigns CCS the exclusive licence with the right to sub-licence, to copy, modify, sell and publish the original or modified program in any form and CCS undertakes to pay a royalty fee of 20 percent of the nett invoice price on the sale of such program(s) and further will pay a fee of £10 in respect of each publication of the respective program listing. CCS assigns





ECC Publications the exclusive world-wide rights to publish the listings of all entries.

- The winning programs shall become the property of CCS, which undertakes to market the programs and to pay the winner a royalty and fees as detailed.

- The organisers retain the right to offer any entries for use by Micronet on an agreed royalty basis.

- Entries will not be returned.

- The judges' decision is final.

- No correspondence can be entered into between entrants and the organisers.

- Employees of ECC Publications and CCS and their associated companies may not enter.

The award will be judged by three people well-known in the world of Sinclair computers—Mike Johnston, organiser of the highly-popular ZX Microfairs and consultant editor of *Sinclair User*; Trevor Toms, author of a number of books on the Spectrum and the ZX-81; and John Gilbert, *Sinclair User* software reviewer. The panel will be chaired by Nigel Clark, editor of *Sinclair User*, and Melvin Lloyd-Jones, a director of CCS.

ENTRY FORM

I agree to abide by the rules of the competition.

Name

Address

Send your entries to ECC Publications, 30-31 Islington Green, London N1 8BJ.

HIGH STAKES BIG DOUGH

That's the name of the game with our new range of Strategy Games.

Take Autochef for instance. You'll have to make every decision possible, from buying food and wines to entering into loan contracts with the ambition of taking over your biggest rival.

How does wheeler dealing in the heart of Texas grab you? In Dallas, you'll need all your wits about you to survive in the oil business and maybe even take over the Euing Empire. Fly high with Airline and really get the business off the ground – that is if you can handle the costing problems, strikes, cancelled flights, hijacks and aircraft crashes. If you'd rather keep your feet firmly on the

ground, run a wheat farm with Corn Cropper. There are many decisions to be made on machinery and labour costs, when to plant, irrigate, fertilize and harvest. Print Shop offers you all the problems of a thriving printing business – from staffing to buying stock and making quotations.

Whatever your taste – whatever your skills, we've got a challenge for you!

Autochef, Dallas, Airline, Corn Cropper and Print Shop. ZX81 and Spectrum 16K £5 each
Spectrum 48K £6 each
Available from WH Smith and all good computer shops or
Dept S8 Cases Computer Simulations Ltd,
14 Langton Way, London SE3 7TL



CC Strategy Games.
5 They're no pushover.

**Enter our programming
competition.
Details page 36-37.**

sinclair special

1



**Inside...
Latest prices round-up...
Latest software...
Order form...**

Introduction

One thing's certain about the Sinclair world – there's never a dull moment.

Every month sees new software and new hardware, produced by Sinclair enthusiasts, or produced by Sinclair itself.

The magazines do a fantastic job of keeping you up to date with the input of enthusiasts. We want to keep you in touch with Sinclair's own developments.

Every month, there'll be a Sinclair Special in this magazine.

Sometimes, inevitably, there won't be anything new to say – we want to break away from the breathless announcements of hardware and software you just can't buy.

But when something new is available, we want you to have accurate information – fast. You'll find it here.

This month, we're giving you the latest information on the recommended retail prices of Sinclair equipment. They're *our* prices, and you may well find things cheaper (or dearer) in the shops. If they're cheaper – terrific! Snap them up. Note, however, that from us the ZX81 is down to £39.95.

We're also announcing six superb new Sinclair cassettes for the Spectrum, and three more which make full use of the ZX81. There's an order form at the back of this Special.

Next month... but there, next month is another story! Watch (as they say) this space.

Nigel Searle

Nigel Searle,
Managing Director,
Sinclair Research Ltd.



Spectrum – latest recommended retail prices.



16K was £125.00
16K now £99.95

48K was £175.00
48K now £129.95

ZX Printer was £59.95
ZX81 was £49.95

ZX Printer now £39.95
ZX81 now £39.95



Six new ways to make more of your Spectrum.

Take a look at these brand-new titles. Each is an outstanding new program using the full potential of the Spectrum, for games with stunningly animated graphics, for strategies of fiendish cunning, for masterly applications of computing capability...

Cyrus-IS-Chess Based on the Cyrus Program, which won the 2nd European Microcomputer Chess Championship and trounced the previously unbeaten Cray Blitz machine. With 8 playing levels, cursor piece-movement, replay and 'take-back' facilities, plus two-player option. The 48K version has many additional features including an extensive library of chess openings. For 16K or 48K RAM Spectrum.

Horace and the Spiders Make your way with Horace to the House of Spiders, armed only with a limited supply of anti-spider-bite serum. In the house, destroy the webs before the spiders can repair them. Then destroy the spiders, before they destroy Horace! Undoubtedly the creepiest Horace program ever produced! For 16K or 48K RAM Spectrum.

Computer Scrabble The famous board game, on-screen – with the whole board on view! A huge vocabulary of over 11,000 words. Full-size letter tiles, four skill levels – the highest of which is virtually unbeatable. For 1 to 4 players. For 48K RAM Spectrum.

(SCRABBLE trademark and copyright licensed by Scrabble Schutzrechte und Handels GmbH – a J.W. Spear and Sons PLC subsidiary.)

Backgammon A fast, exciting program, with traditional board display, rolling dice and doubling cube. Four skill levels. For experts – or beginners. (Rules are included – it's the quickest way to learn the game.) For 16K or 48K RAM Spectrum.

FORTH Learn a new programming language, as simple as BASIC, but with the speed of machine code. Complete with Editor and User manual. For 48K RAM Spectrum.

Small Business Accounts Speeds and simplifies accounting work, produces Balance Sheets, Profit and Loss information and VAT returns. Complete with User manual. For 48K RAM Spectrum.

Overleaf – your Sinclair order form.

Three new ways to get the best out of your ZX81.

The range of Sinclair software for the ZX81 continues to grow.

These three new cassettes offer two totally different challenges to you and your ZX81. The games – like so many ZX81 games today – really do use the ZX81's capability. The FORTH program is a fascinating extension of your own computer understanding.

Sabotage Defender or attacker? The choice is yours in this exciting game.

Be the Guard and defend the randomly placed boxes of ammunition inside the compound – or be the Saboteur and attack the ammunition!

Written by Macronics for a ZX81 with 16K RAM. Cassette price: £4.95.

City Patrol You are the Commander of a laser-firing ship. Your task is to intercept and destroy alien suicide ships descending on your city. Judge your rating as Commander by how many aliens you destroy and how much of your city survives.

Written by Macronics for a ZX81 with 16K RAM. Cassette price: £4.95.

FORTH Discover a new programming language which combines the simplicity of BASIC with the speed of machine code.

FORTH's compiled code occupies less than a quarter of the equivalent BASIC program and runs ten times as fast. It is fully extendable by the addition of user-defined commands.

Free User-Manual and Editor Manual with each cassette.

Written by Artic for a ZX81 with 16K RAM. Cassette price: £14.95.



How to order

Simply fill in the relevant section(s) on the order form below. Note that there is no postage or packing payable on Section B. Please allow 28 days for delivery. Orders may be sent FREEPOST (no stamp required). Credit-card holders may order by phone, calling 01-200 0200 24 hours a day. 14-day money-back option.

sinclair

Sinclair Research Ltd,
Stanhope Road, Camberley,
Surrey, GU15 3PS.
Telephone: (0276) 685311.

To: Sinclair Research Ltd, FREEPOST, Camberley, Surrey, GU15 3BR.

Section A: hardware purchase

Qty	Item	Code	Item Price £	Total £
	ZX Spectrum – 48K	3000	129.95	
	ZX Spectrum – 16K	3002	99.95	
	ZX 81 (including 1.2A Mains Adaptor)	1003	39.95	
	16K RAM pack for ZX81	1010	29.95	
	ZX Printer	1014	39.95	
	1.2A Mains Adaptor, for use with ZX81 computer/ZX Printer com- bination (only required if you have an early ZX81 with 0.7A Adaptor)	1002	7.95	
	Printer paper (pack of 5 rolls)	1008	11.95	
	Postage and packing: orders under £90	0028	2.95	
	orders over £90	0029	4.95	
			TOTAL £	

Section B: software purchase

Qty	Cassette	Code	Item Price £	Total £
FOR SPECTRUM				
	G22/S: Backgammon	4021	5.95	
	G23/S: Cyrus-IS-Chess	4023	9.95	
	G24/S: Horace & the Spiders	4022	5.95	
	G25/S: Scrabble	4024	15.95	
	L1 /S: FORTH	4400	14.95	
	B6 /S: Small Business Accounts	4605	12.95	
FOR ZX81				
	G25: Sabotage	2124	4.95	
	G24: City Patrol	2123	4.95	
	L1: FORTH	2400	14.95	
			TOTAL £	

*I enclose a cheque/postal order made payable to Sinclair Research Ltd for £

*Please charge to my Access/Barclaycard/Trustcard account no:

*Delete/complete as applicable.

(Please print)

Signature

Mr/Mrs/Miss

Address

Sinclair has been overtaken by other suppliers of upgrades. Stephen Adams reports.

Spectrum finds itself at full stretch

THE SPECTRUM is in four basic forms. Model 1s which have two IC-type sockets into which a printed circuit board is plugged and model 2s which have all the RAM fitted on to the main printed circuit board. There are, of course, two types in each category, the 48K and the 16K.

The 48K cannot be expanded, as all the existing memory space is covered with either ROM or RAM — all 64K of it. The ROM can be switched-out externally to add different ROMs using the ROMCS but the RAM cannot as there is no equivalent RAMCS.

Therefore all memory expansions can be done only to the 16K models. As the computer already contains 16K of RAM, the top 32K of memory area — 32K-64K — is the only space to put it. Most memory expansions fill that space with 32K worth of RAM chips but the East London Robotics 64K add-on — the SP80 — has two sets of 32K RAM which can be switched in and out under a program instruction or from the keyboard.

The kits consist of four memory-decoding chips, except model 1 versions where all the chips are soldered to a PCB, and eight 32K by one-bit chips. Those RAM chips are very sensitive to static electricity and warnings are included in all the instruction sheets. The way to handle them properly is not to remove them from their protective packaging until needed and to keep touching an earthed object such as a radiator or gas pipe occasionally to release the static charge. The static can be caused by nylon or wool in your clothing being rubbed.

Putting-in the chips can be a little difficult and it is recommended that you check that the pins are straight before you insert them. The Fox Electronics kit has the pins already straightened.

Also check that none of the pins is bent outside the socket or underneath the chip when you have finished.

The best technique to use is to put all the pins on one side into the socket and then to pull the pins on the other side over the holes in the other side of the socket. Once both sets of pins are resting in the socket holes you can push down gently on the chip to push it into its socket.

The instructions vary from a four-page, step-by-step meticulous description by Delta Research to one page just listing where the chips go by Fuller. Apart from the Fuller instructions all provided sufficient detail to allow you to know where each chip goes and what precautions to take.

As part of its instructions Fox Electronics also includes a sheet showing how to tune the colour on a Spectrum to give better results. It also shows you how to tell whether it is the Spectrum or the TV set causing a problem. Sheets

'The 48K cannot be expanded'

normally cost £1 from Fountain Electronics but are free with its RAM kit, along with a small Basic program to demonstrate the usefulness of 48K.

The fitting of the Fox kit was the easiest but if you have problems you can send back the kit with the details of the Spectrum at any time in the following 12 months. East London Robotics will fit the chips at an extra cost of £7 by post or £3 by personal visit.

Delta sends a memory test tape which checks all the memory by using a machine code program going through at



least all the manufacturer's specifications. The tape can be used to keep an eye on suspect memory faults as it stops with an error which can then be sent back to Delta or Sinclair. The tape normally would cost £3.50 and is a really comprehensive test taking at least eight minutes.

East London Robotics and Delta were the only model 1 boards we could test and both could be fitted easily with less trouble than the model 2.

East London Robotics also does an SP80 kit which can provide 64K of memory in the same sockets as the SP48 (48K) fitted. That is achieved by having two separate banks of 32K, switched by an OUT instruction.

That is possible only because of the 64K RAM chips which are used instead of the 32K RAMs and a massive modification of the decoding chips which plug into the Spectrum. No soldering is required but some care needs to be taken inserting the chips, as three of them are wired together using twisted insulated wire.

A LED is also soldered on to one of the chips to indicate which bank is being used. The only problem is that you can see it only with the top off or looking through the edge-connector hole. The LED lights when it is in bank two and when the machine is turned on the light shows on bank one.

The only problem with the SP80 is that the stack and any program running in it must be in the 16K of memory provided by Sinclair. If it was allowed to go into the top 32K it would be switched-out on the first OUT instruction and the program would have nowhere to go.

Also the machine code stack for return addresses would have to be in the lower 16K area for the same reason. That leaves the user to develop a pro-

Spectrum Expansion

gram which will be able to use banks of memory without having the convenience of Sinclair Basic to cope with it.

Prices of the various kits are detailed, along with an indication of how good the instructions were, guarantee period and number of tests performed on memory after fitting.

It is also possible to add a RAM pack on the back of the Spectrum. A Spectrum-type 32K RAM pack has been produced by Cheetah Marketing Ltd. It fits very snugly on the back of the Spectrum and because it is outside the case it does not matter if it is model 1 or model 2.

It also has an extension piece on the back so that you can plug in Microdrives when they arrive. The RAM pack has no known wobble in use and can be fitted very easily by plugging it into the expansion port. It costs £39.95.

The alternative is to use a ZX-81-type RAM pack with an adaptor to give you another 16K or 32K. To use it you will require an adaptor.

EPROM Services and myself both make adaptors for the 16K RAM pack. Mine can also cope with a 64K RAM pack to give a full 32K by changing a soldered strap on the board or ordering a 64K version. I also produce an Adam II which lets you have a 16K RAM

pack on the back of the Spectrum but which also allows devices which used to work in the popular 8K-16K region to work in the 56-64K region of the Spectrum. All the adaptors mentioned cost £9.

Of the RAM packs and kits reviewed. Fox Electronics for kits and Cheetah for RAM packs stand out as good value for money.

Fox Electronics, 141 Abbey Road, Basingstoke, Hampshire. Tel: 0256-20671

Cheetah Marketing, 359 The Strand, London WC2 OHS. Tel: 01-240-7939.

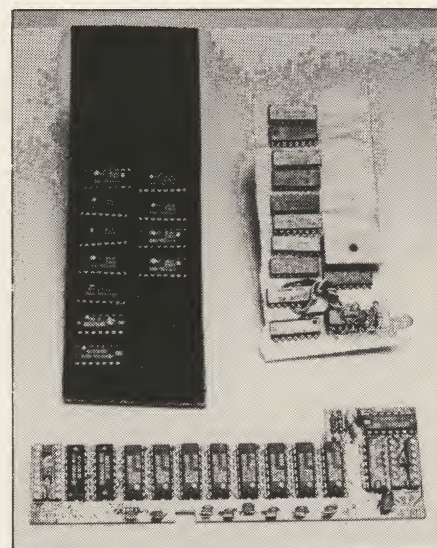
East London Robotics, No. 11 Gate, Royal Albert Docks, London E16. Tel: 01-471-3308.

Delta Research — cheques to Servodata Ltd — 15 Church Street, Basingstoke, Hampshire. Tel: 0635-45373.

Fuller Micro Systems, 71 Dale Street, Liverpool 2.

Eprom Services, 3 Wedgewood Drive, Leeds LS8 1EF. Tel: 0532 667183.

Stephen Adams, 1 Leswin Road, London N16 7NL.



Producer	RAM	Instructions	Model	Guarantee	Tests	Price
Fox	32K	Good	2	12 months	1	£24
ELR	32K	Good	2		1	£23.65
Delta	32K	V. good	1		> 100	£33
Delta	32K	V. good	2		> 100	£26
Fuller	32K	Poor	2		1	£24.30
ELR	32K	Average	2		1	£23.65
ELR	64K	Average	1		1	£50.65
E'	64K	Average	2		1	£46.65

At last! A joystick that works!

Cambridge Computing bring you the first intelligent joystick.

Works on all existing software - regardless of which keys the program uses. No need for specially written software. Features include:

- Compatible with Spectrum, ZX81, Jupiter Ace
- 2 Independent Fire Buttons
- 8 Directional Microswitched action
- Plugs into edge connector
- Interface complete with edge connector
- Atari joystick compatible
- Joystick with Interface £29.90

Name.....

Address.....

Please send me:

.....joystick, interface, and tape @ £29.90....

Spectrum ☐ ZX81 ☐ Jupiter Ace ☐

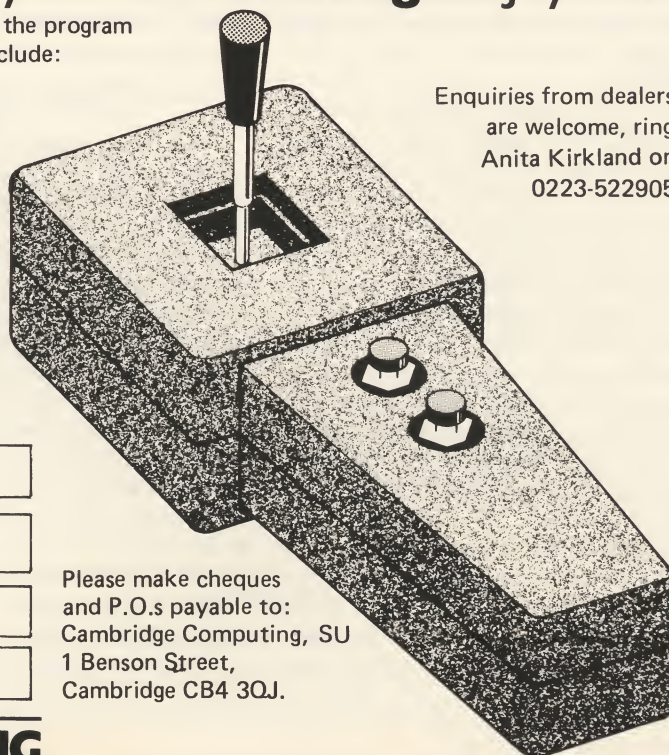
.....interface and tape @ £24.00.....

Spectrum ☐ ZX81 ☐ Jupiter Ace ☐

.....joysticks @ £7.00.....

Spectrum ☐ ZX81 ☐ Jupiter Ace ☐

Total including VAT.....



Enquiries from dealers are welcome, ring Anita Kirkland on 0223-522905

Please make cheques and P.O.s payable to: Cambridge Computing, SU 1 Benson Street, Cambridge CB4 3QJ.

CAMBRIDGE COMPUTING



THIS SPACE INTENTIONALLY LEFT BLANK

Your masterpiece could appear here. We need good, original machine-code programs for the Spectrum and Oric. Excellent royalties or cash payments offered for high quality games. If you have written an exceptional program, please send a copy to the address below for immediate evaluation.



NIGHT GUNNER

Enemy aircraft approaching . . . BATTLESTATIONS!!
Waves of enemy fighters swooping in for the attack? Can you survive another mission? This is the ULTIMATE challenge. An entertaining machine code game with excellent graphics. Requires ZX81 with 16K RAM pack.
Highly addictive! £4.95 inc.

Now Available
at major branches of
WHSMITH



FIGHTER PILOT

15 feet . . . 7 feet TOUCHDOWN! Instrument landings are not always as easy as this. You are in full control from take-off to landing during this real-time flight simulation of a jet fighter. Written by pilots — tested by pilots — for you to fly like a pilot.

'An excellent program!' Capt. H. Senior British Airways pilot.
Requires ZX81 with 16K RAM Super value at £4.45

DIGITAL Integration

DIGITAL INTEGRATION
Dept. SU
22 Ash Church Road,
Ash, Aldershot
Hants GU12 6LX.

MAILORDER ONLY

TRADE ENQUIRIES
WELCOME

All prices inclusive
(Overseas add £0.55 p&p per tape)
All products guaranteed, refund if not satisfied.

A good idea worth sharing. Custom Keypanel Kits for the Spectrum and now the ORIC



Put everything you
need on the keyboard
with a Custom Keypanel Kit.

Precision die-cut panels fit perfectly over your keyboard and create an instant and individual reference to all your software.

Each kit comes in a clear plastic wallet and contains: 10 matt black Keypanels plus sheets containing over 140 self-adhesive command labels, pre-printed with words and symbols — arrows, left, right, FIRE!, POWER!, etc, plus a sheet of blanks for your own designs.

SPECTRUM Keypanels (96 x 224 mm)
Self-adhesive label sets are printed in 'Spectrum' bright red. A must for flight simulation and all multi-key games and applications, the first add-on for your Spectrum.

ORIC Keypanels (105 x 275 mm)
Self-adhesive label sets are printed in 'ORIC' light blue. Master those CTRL and ESC key combinations and create a reference to all ORIC's keyboard functions.

NOW in super ML PLASTIC.
We despatch to you first class post by return.*
*Subject to stock availability

Post today to **Softeach Limited**, 25 College Road, Reading, Berkshire, RG6 1QE.

Please send me:

..... Spectrum Keypanel Kits at £3.95 + 35p p&p each
(overseas should add 25% for additional surface mail)

..... ORIC Keypanel Kits at £4.95 + 35p p&p each
(overseas should add 25% for additional surface mail)

I enclose a total remittance of £ cheques/postal
orders payable to **Softeach Limited**.

NAME

ADDRESS

SU JU3

A MUST FOR ANYONE INTERESTED IN ZX MACHINE CODE!

The finest range of utility programs for ZX Computers. Used by professionals. Very useful for beginners



ZX SPECTRUM MACHINE CODE SYSTEM (The key to machine code success)

SPECTRUM EDITOR/ASSEMBLER A powerful and essential machine code programming aid. 16K and 48K on same cassette + full documentation. 40 column screen display, tabulated into Major features: EDITOR with Auto line number and renumber, cursor control; SAVE/LOAD/VERIFY fields for easy reading. 5 character label names, easy line editing and cursor control; decimal or hex numbers, output to ZX PRINTER. TWO PASS ASSEMBLER accepts all Z80 mnemonics, decimal or hex numbers, simple arithmetic on operands. Assembler Directives — ORG, END, DEFB, DEFW, DEFL, EQU, DEFM. **ONLY £8.50**

SPECTRUM MONITOR Machine Code Debug/Disassembler Enter, Run, Debug M/C programs. Compatible with BASIC. Breakpoints and Registers Display. Disassembler to screen or ZX PRINTER. 16K and 48K on one cassette + 30 page manual. **ONLY £7.50**

ZX81 UTILITIES (For everyone... beginner to professional)

ZX81 RELOAD Machine Code Debug/Monitor Explore and master machine code. Compatible with BASIC. CREATE A REM line — any length. BREAKPOINTS & REGISTERS DISPLAY. Fully documented 30 page manual and cassette. 16K to 64K. **ONLY £6.95**

ZX81 ZX-MC Machine Code Debug/Monitor The professional one! ENTER/RUN/DEBUG M/C programs. SAVE/LOAD/VERIFY at double speed. BREAKPOINTS & REGISTERS DISPLAY. Self-contained machine code — cannot be used with BASIC. 36 page manual and cassette. **ONLY £7.50** 4K to 64K

ZX81 SCREEN KIT 1 More screen power in your BASIC programs! CLEAR and REVERSE part of the screen. FLASHING CURSOR anywhere on screen — simulates INPUT. DATA FILES SAVE/LOAD BASIC variables — Double speed. 880 Bytes machine code for instant response. Becomes part of your BASIC program. **ONLY £5.70** 4K to 64K

SEND CHEQUE/P.O. FOR FAST MAIL ORDER!
S.A.E. for full details.
6 Corkscrew Hill, West Wickham, Kent BR4 9BB
* All prices include VAT & P&P

Spectrum Software available from: Buffer Micro Streamham, Microware Leicester. Educational suppliers: Griffin & George

NOW IN YOUR HIGH STREET SHOPS

FOOTBALL MANAGER 3D

by Addictive Games

for SPECTRUM 48K AND ZX81 16K

ACTION FROM THE

SPECTRUM VERSION

➔ This superb game is now available from branches of W.H. SMITH * and BOOTS.

Manage your own team in this exciting game of skill which vividly captures the drama and excitement of real football.

FEATURES INCLUDE:

- * 4 DIVISIONS * F.A. CUP * PROMOTION & RELEGATION *
- * TRANSFER MARKET * TEAM SELECTION *
- * SAVE GAME FACILITY *** AND MUCH MORE! ***

WHAT THE PRESS SAY ABOUT IT:—

➔ IF YOU have always wanted to manage a football team, FOOTBALL MANAGER, from Addictive Games, is for you — The game is ideal for a football fanatic but the most interesting thing for us was the 3-D graphics used to create the goalmouth action — the game is a winner. SINCLAIR USER FEBRUARY 1983

➔ Although I'm no great football fan, I really enjoyed playing this game — excellent use is made of colour and user-defined graphics. The game is very logically put together, so that the development of strategy and tactics has a real effect. For example, one of my teams got through to the fourth round of the F.A. Cup where it was beaten by a second division side. This upset morale and meant that our promotion bid failed. Perhaps I should have given up the F.A. Cup run and held some good players back — the possibilities are endless. Brian Clough had better watch out!

* SPECTRUM VERSION ONLY.

ZX COMPUTING FEB/MARCH 1983

ALSO AVAILABLE FROM THE FOLLOWING SHOPS
BUFFER MICRO SHOP (London)
MICROWARE (Leicester)
ANIRGO COMPUTERS (Hemel Hempstead)
SUCCESS SERVICES (Walsall)
THE COMPUTER SHOP (Newcastle)
DRAGON BYTE (Leeds)
AND OTHER GOOD COMPUTER SHOPS

PRICES
FOR THE SPECTRUM 48K/65 ZX81 16K £5.95
3D GRAPHICS ONLY IN SPECTRUM VERSION
To Order send Cheque P.O. payable to
ADDICTIVE GAMES, Dept. SU, P.O. Box 278
Conisburgh, Milton Keynes MK14 7NE
PLEASE STATE COMPUTER

Spectrum and ZX-81 Mukbus

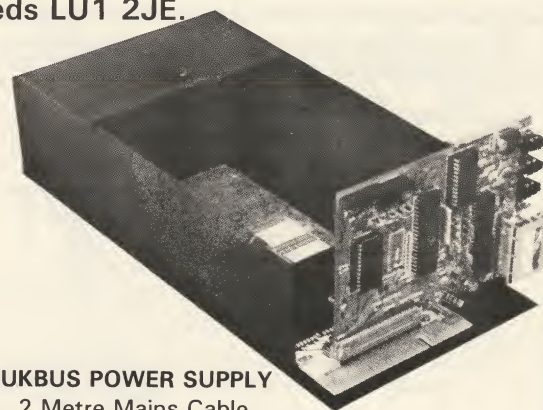
Microtext (U.K.) Ltd, 18-24 John Street, Luton, Beds LU1 2JE.
Tel: (0582) 418894 Telex: 826801 (Letrit G)

MUKBUS CARDFRAME

- ★ 6 Slot Motherboard complete with connectors
- ★ Fully Buffered 64 Way Signal Bus
- ★ On Board Reset Switch
- ★ Sinclair Edge Connector Expansion
- ★ Compatible with Microtext Accessories
- ★ Coming Soon:

- ★ 32K Ram Board
- ★ Disc Interface Board
- ★ Bar Code Reader Board
- ★ Full 80 Column Video Interface
- ★ Digital/Analogue Board
- ★ Full Colour High Resolution Graphics Board
- ★ Centronics/RS232 Interface

PRICE £34.95 (including VAT) (plus £2.00 P&P)



MUKBUS POWER SUPPLY

- ★ 2 Metre Mains Cable
- ★ Illuminated On/Off Switch
- ★ 5 Volt @ 5 Amp, 12 Volt @ 3 Amp.
- ★ Capable of Driving Full Bus and Discs

PRICE £34.95 (including VAT) (plus £2.00 P&P)

MUKBUS KEYBOARD

- ★ Professional typewriter style (Nice 'feel')
- ★ Fully colour coded (for ease of function operation)
- ★ Cursor Pad (for single handed use)
- ★ Automatic Delete Key (easier to edit)
- ★ Unassigned Keys (for the engineer)

KEYBOARD PRICE £39.95 (including VAT) (plus £2.00 P&P)

KEYBOARD CASE £9.50 (including VAT and P&P)

Please state ZX-81 or Spectrum when ordering or making enquiries.





In a place forgotten by time, the beating of wings heralds an incarnation too horrifying to believe - Terror Daktil 4D. A game so terrifyingly real that you'll need all your courage just to remain at your 48K Spectrum screen. As the dreaded prehistoric monsters swoop down, intent on your destruction, a battered pistol and marksmanship are your only defence. You must fight for your life and as the sun sets, your chances of survival begin to slip away. For at night, you'll only see the gleam of their eyes! Terror Daktil 4D - a game beyond your wildest dreams; not just 3-dimensional graphics reaching out of your Spectrum to engulf you, but also the 4th dimension of time that turns day into menacing night at an alarming rate. Unbelievable thrills await those brave enough to enter the lost world of Terror Daktil 4D.

Two more super 48K Spectrum programs:
PENETRATOR "...immensely playable, yet very difficult and horribly addictive." - *Computer & Video Games*.

MELBOURNE HOUSE PUBLISHERS



THE HOBBIT "The Hobbit is far superior to any other adventure game available for the Spectrum" - *Your Computer*
"A game by which future games will be judged." - *P.C.T.*

Melbourne House Publishers
Orders to: 131 Trafalgar Road, Greenwich, London SE 10
Correspondence to: Glebe Cottage, Station Road, Cheddington, Leighton Buzzard, BEDS LU7 7NA.

☐ Please send me your **free** Catalogue.

Please send me:
☐ Terror Daktil 4D - 48K Spectrum cassette - £6.95
☐ The Hobbit package - 48K Spectrum cassette, full colour instruction manual and Hobbit book - £14.95
☐ Penetrator - 48K state-of-the-art arcade game - £6.95
Please add 80p for post & pack.) I enclose cheque/money order
or debit my Access card No. _____ Expiry date _____

£ _____

Signature _____
Name _____
Address _____

Postcode _____
Access orders on 24-hour ansaphone
(01) 858 7397

SUB

Following last month's review of assemblers John Gilbert turns his attention to their counterparts the disassemblers.

Making machine code easier to understand

THE TERM disassembler has been used in many ways by professional producers of software to describe their products and some confusion has arisen as to what a disassembler should or should not do. The strict definition of a disassembler calls for a program which will translate the numeric values of machine code into the mnemonics of assembly language. There are other packages which do all kinds of things with machine code but do not fulfil that definition. The correct term for those packages is toolkit.

The mnemonics of assembly language look like shortened versions of Basic keywords. They are used to represent the machine code numbers which computers can understand but which human programmers still find difficult to cope with in great quantities. It is much easier to understand a mnemonic such as RET, which means Return to Basic, than its machine code counterpart, which in this case is 201.

Most disassembler packages include a monitor program which allows the user to change machine code stored in RAM which has been disassembled. The disassembler makes the editing process easier, as mistakes can be spotted quickly if the programmer has a disassembly and not just a list of numbers which have to be sorted.

When computers had just been invented there was little software and

assemblers made things easier. You could enter code in mnemonic form using the assembler and check the code using the disassembler.

When microcomputers were invented the disassemblers used on the large mainframe computers had to be altered to work on the smaller systems, as many of the instructions which were used on mainframes could not be used on micros.

The first disassembler to appear commercially for the ZX-81 was ZXDB, from Bug-Byte. The company has built its reputation with that package along with its ZXAS assembler and the reason was because it was cheap and ran on an expensive computer.

The Bug-Byte disassembler was fairly standard in its performance. It allowed you to specify the address, or position in memory, at which you wanted the disassembly to start. The program would disassemble one line at a time and you had to press NEWLINE for the next instruction in memory to be disassembled.

The ZXDB for the ZX-81 used two fields, or areas, on the screen in which to display information. The first showed the address at which an instruction was located and the second showed the disassembly of the machine code instruction.

Other disassemblers, such as the Crystal Computing Monitor and Disas-

If a company produces both a disassembler and an assembler it usually makes both programs compatible. That means that both programs can be put into the computer to work together and dispenses with the need to load one program to enter code and then load the next to check that the code is correct.

Having both programs in RAM at the same time will make programming in machine code quicker and easier but the amount of memory left for machine code programs will be reduced drastically. The advantages outweigh the disadvantages, though, so it is a good idea to buy a disassembler which can be used together with an assembler.

Two problems occur when a disassembler starts to produce question marks because it has not been programmed to recognise a machine code instruction. One disassembler which does not follow the Z-80 instruction set is ZXDB from Bug-Byte. The program uses 8080 code instead of Z-80. Instructions which are common on the Z-80 are named differently on 8080. For instance, LD in Z-80 is called M in 8080 code. Those two names mean different things. The LD instruction means load a register with a value, whereas M means move.

Trying to use a disassembler which does not understand the full Z-80 instruction set is like trying to use BBC Basic on a Spectrum or ZX-81. As BBC Basic is not the same as Sinclair Basic, the machine would not recognise the extra commands of the other language. As a result, when buying a disassembler, make sure that the program understands the complete Z-80 instruction set and not just a subset.

Disassemblers can serve two purposes. They can be used to view code which you have stored in RAM or they could be used to look at the ROM of the machine.

With a good disassembler you could obtain a listing of the complete Sinclair ROM for either the ZX-81 or Spectrum. If you knew sufficient about machine code you might also be able to tell

'The strict definition of a disassembler calls for a program which will translate the numeric values of machine code into the mnemonics of assembly language.'

languages such as Basic and Pascal did not exist. Programmers had to use programs which consisted of long lists of numbers. You can imagine the trouble if those programs did not work. Every number in the program would have to be checked to see if it was correct.

The invention of assemblers and dis-

sembler for the Spectrum, use three fields. The extra area on the screen is used to display the numeric machine code on which the disassembler is working. It is a good idea as you can check the mnemonics and machine code against each other to see if the disassembler is working correctly.



how the ROM works. To investigate the ROM, or go bug-hunting in it, you need the proper kind of disassembler. Picturesque produces a monitor and disassembler package which suits the purpose. The disassembler has to provide facilities for output to a printer, as the Basic interpreter and operating system within the ROM are very lengthy.

A true analysis would have you jumping to different parts of the ROM when JP, or Jump, instructions are indicated. Jump is similar to the Basic GOTO instruction but there are many options available with that command and the disassembler will help you to spot them.

Your disassembler should be capable of handling the RST instruction as it is used many times in the ROM. It means ReStarT and the instruction provides a quick entry point into the ROM for programmers using ROM routines in their machine code programs.

The RST 10 instruction, for instance, would send the computer con-

trol to the part of the ROM which deals with the printing process. The routine sets up the machine to display one character on the screen.

Most disassembler packages on the market for both Sinclair machines are being sold mainly as an afterthought to assembler packages. The disassembler has a very important role in computing

'Many programs on the market could be streamlined.'

and the second-class sticker with which it has been labelled is unfair.

A disassembler should be a necessity when you are writing machine code programs.

If you are to buy one, take as much time about choosing it as you would when buying an assembler. In many cases it will be the disassembler which

will disappoint you with its performance and not the assembler.

For instance, the Bug-Byte ZXDB was a breakthrough when it was launched but with hindsight it is somewhat mediocre. The standard of the documentation with ZXDB was far from satisfactory; as a result, the program was difficult to use.

Disassemblers are becoming more complex all the time and there is not much which can be done to improve them. Many of the programs on the market, however, could be streamlined to fit into less RAM than is now the case.

dK'tronics, Unit 2, Shire Hill Industrial Estate, Saffron Walden, Essex, CB11 3AQ.

Crystal Computing, 2 Ashton Way, East Herrington, Sunderland, SR3 3RX.

Picturesque, 6 Corkscrew Hill, West Wickham, Kent, BR4 9BB.

P.S.S. THE FUTURE MAKERS

FANTASIES FOR ZX81 AND SPECTRUM



TAI

In any other time or galaxy, the dust ball world called TAI would have been quite unimportant. **TIMES CHANGE**.... Now it is the last remaining out-post between the advancing Imperial Fleet and the main planets of the Dorfian System. Unless the Imperial Forces can be held off until the Republican battle fleet arrives, an entire civilization will be betrayed.... You have been chosen to defend TAI. The Galactic future depends on you.

ZX81 16K 4.95

HOPPER

Can you help Fergy and his friends get across the 4 lane highway and back to the lilly pond? Includes Crocodiles, Logs, varying traffic speed etc.

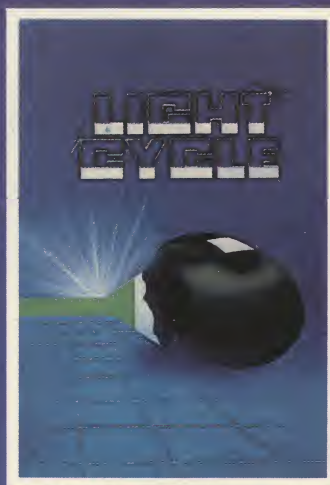
ZX81 16K 3.95



M CODER

Quite simply the most flexible integer compiler available today for either the 16K ZX81 or the Spectrum 16K/48K.

ZX81 16K 7.95
SPECTRUM 48K 8.95



LIGHT CYCLE

All the speed and excitement you could want, very addictive. Race and block the computer or another player.

SPECTRUM 16K 48K 4.95



KRAZY KONG

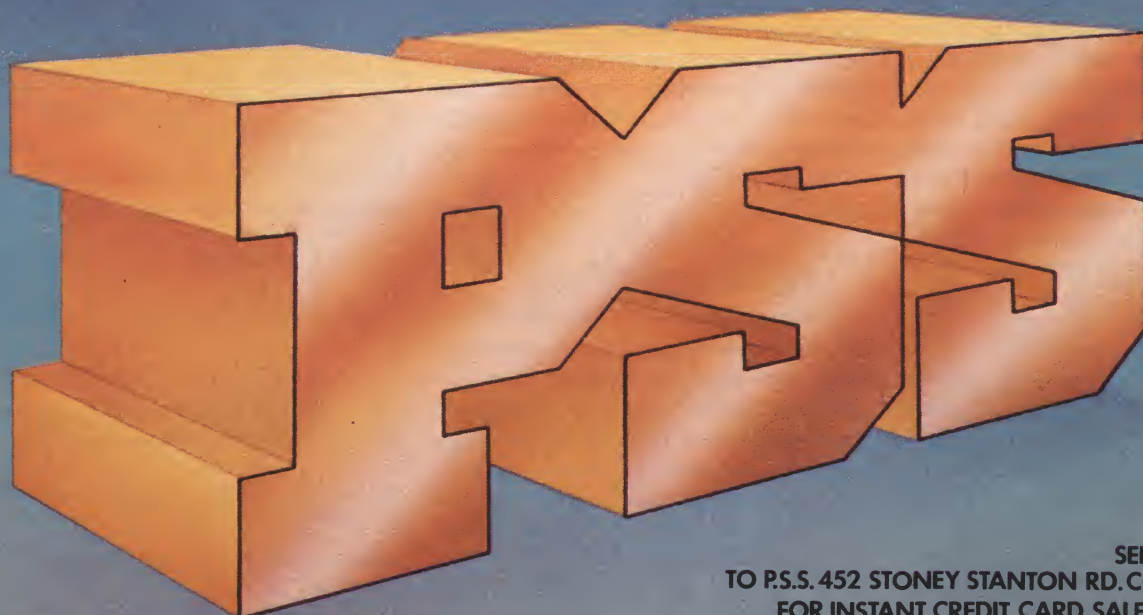
All machine code version of the popular arcade game. This program has all the features of the original and is every bit as fast. 3 different screens make it difficult to beat.

ZX81 16K 3.95

MAZE DEATH RACE

Drive through a giant maze, 9 times the size of the screen picking up points as you go - but watch out for other cars rocks, oil and ice. Superb machine code game. Highly recommended.

ZX81 16K 3.95
SPECTRUM 48K 4.95



SEND CHEQUE OR P.O.
TO P.S.S. 452 STONEY STANTON RD. COVENTRY CV6 5DG.
FOR INSTANT CREDIT CARD SALES TEL (0203)667556

TRADE ENQUIRIES CONTACT JOHN FLETCHER, COVENTRY (0203) 667556

WE HAVE SOUND . . . COLOUR . . . ACTION . . .
 . . . WE HAVE R&R SOFTWARE



Whether you have an Oric, Spectrum or ZX81 you can play golf in the comfort of your home.
ZX81 16K (Not illustrated) All the excitement of the professional circuit. For 1 or 2 players. You can select either 9 or 18 hole course. Try and overcome obstacles such as trees, bunkers, water – even the rough can be tricky! Full on screen instructions. ONLY £3.75

Spectrum Golf 16K Similar to ZX81 Golf but utilizing the Spectrum colour graphics and sound. ONLY £3.75

Oric Golf 48K A Further development of Spectrum Golf utilizing 48K of memory and the excellent Oric graphics. For 1 to 6 players. ONLY £7.95
 If golf isn't your game try the other games in our range.

FOR SPECTRUM

Star Trek 48K See if you can rid the galaxy of the evil Klingons, save the Federation from the treacherous Romulans, race to protect your star-bases from attack. Are you star-ship commander material? ONLY £4.95

Spectipede 16K See how long you can keep the Spectipede at bay as they descend upon you. You'll have the help of poison mushrooms and your gun

which both kill the Spectipedes but look out for the spider – he will try to jump on you. For 1 or 2 players. Operates with most leading Joysticks or the Keyboard. ONLY £4.95

Gnasher 16K The ultimate maze game. Eat the dots but look out for the ghosts they could eat you! If you eat an energy pill you can eat the ghost. Full colour graphics and sound. Operates with most leading Joysticks or the Keyboard.

NEW FOR THE ORIC

Oric Quizzmaster 48K A menu driven quiz game utilizing sound and colour. Instructions are also given to substitute your own questions and answers. Great fun for all the family and ideal for education i.e. revision.

Quizzmaster 1 – General knowledge, sports and pastimes.

Quizzmaster 2 – General knowledge, rock and pop.

Quizzmaster 3 – Out soon.

ONLY £7.95 each which includes a £2.00 discount voucher for your next Quizzmaster.

Further Quizzmasters to follow.



34 Bourton Road,
 Tuffley, Gloucester, GL4 0LE
 Tel: (0452) 502819

SPECTRUM GOLF
 available from
 WHSMITH

PERSONA ZX

YOUR KEY

TO THE

TOWER

OF

POWER



You simply choose the following modules you want and plug them into the PERSONA and turn your ZX81 or ZX SPECTRUM into a total computing package ... into an ORGANIC MICRO.

PERSONA ZX81	£30.35
PERSONA ZX SPECTRUM	£45.00
RAM 08 (2K)	£24.50
RAM 16	£26.75
RAM 64	£26.25
MINIMAP	£35.95
DROM (2K)	£39.50
TOOLKIT	£22.20
PERICON a	£27.90
PERICON b	£33.75
PERICON c	£41.75
SONUS	£30.15

Options: USERFRONT	£8.00
Additional 2K for RAM 08	£6.50
Additional 2K for DROM	£7.50

Prices include VAT, Postage and Packing for U.K. deliveries. Overseas Orders: please add 15% to price for surface mail.

Post to: BASICare MICROSYSTEM LTD.
 12 Rickett Street, London SW6 1RU.
 Tel: 01 - 385 2135



BUFFER MICRO SHOP

310 STREATHAM HIGH ROAD, LONDON SW16 6HG
Tel: 01-769 2887

Open Tues—Sat 10.30 am to 5.30 pm (Closed Mondays)

SOFTWARE FROM ALL THE BEST SUPPLIERS—
OVER THE COUNTER—PLUS GROWING RANGE
OF PERIPHERALS. SEE IT 'N TRY IT BEFORE YOU
BUY IT.

SAE appreciated for catalogue—but please specify
for which computer.

DRAGON ZX-81 ZX SPECTRUM

THE WORLD'S GREATEST RANGE OF
SINCLAIR SOFTWARE
PIONEERS IN 1981—WAY AHEAD TODAY

BBC-ACORN KEYBOARDS ADD-ONS
CASSETTES BOOKS VIC20

*NEW!—BUFFER CLUB for regular customers.
Special Offers—Lectures—Foreign Trips—
Software Promotions. Ask for details of member-
ship on your next visit.*

MEMBER OF THE COMPUTER TRADE ASSOCIATION—YOUR FAIR DEAL GUARANTEE

VISA—ACCESS—AMERICAN EXPRESS—DINERS CLUB
ALL CARDS WELCOME



For SPECTRUM 48K or ZX81 16K

You are an Allied POW in the infamous **Castle Colditz**, Nazi fortress jail for Allied prisoners-of-war! Can you escape with your life through the vast labyrinth of rooms to the main gate? Tackle brutal **Gestapo** and **SS** guards, savage guard-dogs, traps and pitfalls! Survive if you can the **Corridor of Rats**, the **Tunnel of Poisonous Spiders**, the **Vault of Human Bones** and many more! And on your way, grab all the fabulous **Nazi loot** you can carry!

* **Classic adventure games** — no random alterations!

* **Fast, powerful machine-code** response to your commands!

* "Save-game" facility and (you'll need it!)

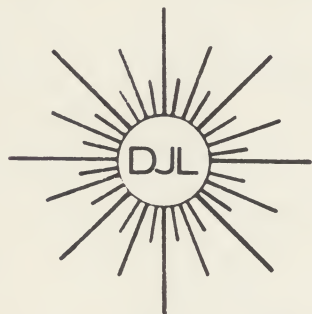
Hours (weeks?) (months?) of enjoyment!

For ZX81 with 16K RAM £4.95

For 48K SPECTRUM £5.95

Price includes ready-to-load cassette with library case and inlay, full instructions, postage and packing. Order today! Money refunded if not delighted!

Send cash, P.O. or cheque to:
FELIX SOFTWARE (DEPT. SU12)
19 Leighton Avenue, Pinner, HA5 3BW

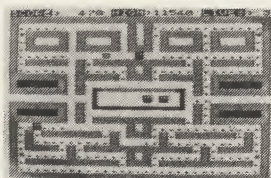


DJL SOFTWARE

DEPT SP, 9 TWEED CLOSE, SWINDON, WILTS SN2 3PU

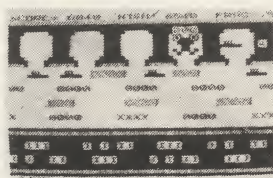
Tel: (0793) 724317 Trade enquiries welcome

Export Orders: Please add £1.00 per tape airmail



ZUCKMAN ZX81 (16K)

- * ALL MACHINE CODE (10K)
 - * FOUR INDEPENDENT GHOSTS
 - * HIGH-SCORE 'HALL OF FAME'
 - * AUTHENTIC ARCADE ACTION
 - * TITLE/DISPLAY MODE
- ONLY £4.95 INC. P&P



FROGGY ZX81 (16K)

- * MOVING CARS, LOGS, TURTLES
 - * ALLIGATORS, DIVING TURTLES
 - * FOUR 'SCREENS' OF ACTION
 - * ALL ARCADE FEATURES
 - * ENTIRELY MACHINE CODE
- ONLY £4.95 INC. P&P

★ NEW ZX Spectrum FROGGY 16K or 48K ★ NEW

SPECTRUM VERSION OF
ARCADE GAME WITH FULL ARCADE
FEATURES:

- ★ Fabulous Hi-Res Colour Graphics
- ★ Authentic Sound Effects + 3 Tunes
- ★ 3-D Logs, Swimming & Diving Turtles
- ★ 3 Lanes of Multi-coloured vehicles
- ★ On-screen Score, Hi-Score, Time-bar
- ★ Snake, Alligators and Baby Frog
- ★ 'Top 5' High-Score initials table
- ★ Demonstration Game routine

Your home-sick frog must leap across a busy main road, then onto logs and turtles in the river to reach safety of the river-bank frog-homes. THIS MACHINE-CODE GAME MUST BE SEEN TO BE BELIEVED!!

ONLY £5.95 INC. P & P



FOX ELECTRONICS *Presents*



SPECTRUM UPGRADE KITS

ONLY!

£21.00 INCL
(issue 2 machines only)

A high quality kit at a new Low, Low Price, which simply plugs into existing sockets within your Spectrum. No soldering is required and step by step instructions are supplied.

PROBABLY THE BEST KIT AVAILABLE AT DEFINITELY THE LOWEST PRICE

Should you require any more information on the kit (or any other items). Please phone or write to us at the address below.

SPECTRUM/ZX-81 FULLER FD42 KEYBOARD

FOR THE SPECTRUM OR
ZX-81. A42 KEY FULL
TRAVEL, CASED
KEYBOARD WHICH
YOUR MACHINE SITS
INSIDE, PLUGS IN
(NO SOLDERING REQ.).



£29.95
INCL

SPECTRUM JOYSTICK

A DELUXE JOYSTICK CONTROLLER COMPLETE
WITH INTERFACE AND

- CONTOURED GRIP
- 2 FIRE BUTTONS
- 4 FEET OF CORD
- 4 SUCTION CAP GRIPS FOR TABLE

TOP CONTROL **£19.50**

DEALER ENQUIRIES WELCOME

Many other Products

SEND NOW TO:

FOX ELECTRONICS

141 Abbey Road, Basingstoke, Hants. Tel: 0256 20671

AVAILABLE EX-STOCK
Send S.A.E. for details

CALLERS WELCOME
BY APPOINTMENT



ZX-81

THE BEST AVAILABLE EXPANDABLE RAM PACK AT THESE
NEW LOW PRICES!!

16K

£19.50

+ 45p P&P



32K

£34.00

+ 45p P&P

The ZX-Panda a specially contoured unit designed to eliminate wobble and memory loss, housed in a very attractive case with red LED on/off indication.

ZX-81

Z
X
8
1
Another replacement keyboard-this
one with a calculator type feel. Peel
off backing and press to fit.
Incredibly low
price of
£10.00



Z
X
8
1

AGF

PROGRAMMABLE JOYSTICK INTERFACE

for

sinclair

ZX Spect 81

ABOUT OUR PROGRAMMABLE INTERFACE

Surpassing the outstanding specification of our Interface Module II which still offers the best software support at its price, a Joystick Interface that is compatible with ALL SOFTWARE through its unique hardware programmable design.

The Interface plugs on to the rear connector of your ZX81 or ZX Spectrum.

Quick clip-on connections, which are configured from a reference card supplied, allow you to define which of the forty keys are simulated by which action of the Joystick. A pack of ten Quick Reference Programming Cards makes setting for your favourite games even easier. These can be filled in to show at a glance the configuration required and stored in the cassette case of the particular game. When you change to a game using different keys the module is re-programmed in a few seconds.

As with our Interface Module II the Programmable Interface accepts all standard switch Joysticks that are Atari-compatible. Two sockets are available which are connected together for two player games which use the same keys for both players.

The Interface resides in the keyboard address space and does not affect its operation or interfere with any other add-ons. A rear extension edge connector will accommodate expansion of your system.

The unique AGF key simulation principle makes it extremely easy to incorporate Joystick action in your own programs. All eight directions and fire are read by simple BASIC.

With every order comes a free demonstration program called 'Video Graffiti' plus a full set of instructions.

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

JOYSTICKS

ATARI
CONTROLLERS

FOR USE WITH OUR INTERFACE
Module or VIC 20, Commodore 64,
Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our
original interface module mark order
'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

TOTAL SOFTWARE COMPATIBILITY!

ONLY
32.95
+£1.00pp

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.
FREEPOST, BOGNOR REGIS, WEST SUSSEX PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	PACK(S) QUICK REFERENCE CARDS	1.00	
	INTERFACE MODULE II	20.95	
	JOYSTICK(S)	7.54	
	SOFTWARE AS TICKED ON LIST		
	SOFTWARE AS TICKED ON LIST		
ONE	VIDEO GRAFFITI	FREE	
ZX81 ☐ ZX SPECTRUM ☐ Please tick		FINAL TOTAL	
DEALER ENQUIRIES WELCOME		EXPORT PRICES ON APPLICATION	

NEW!

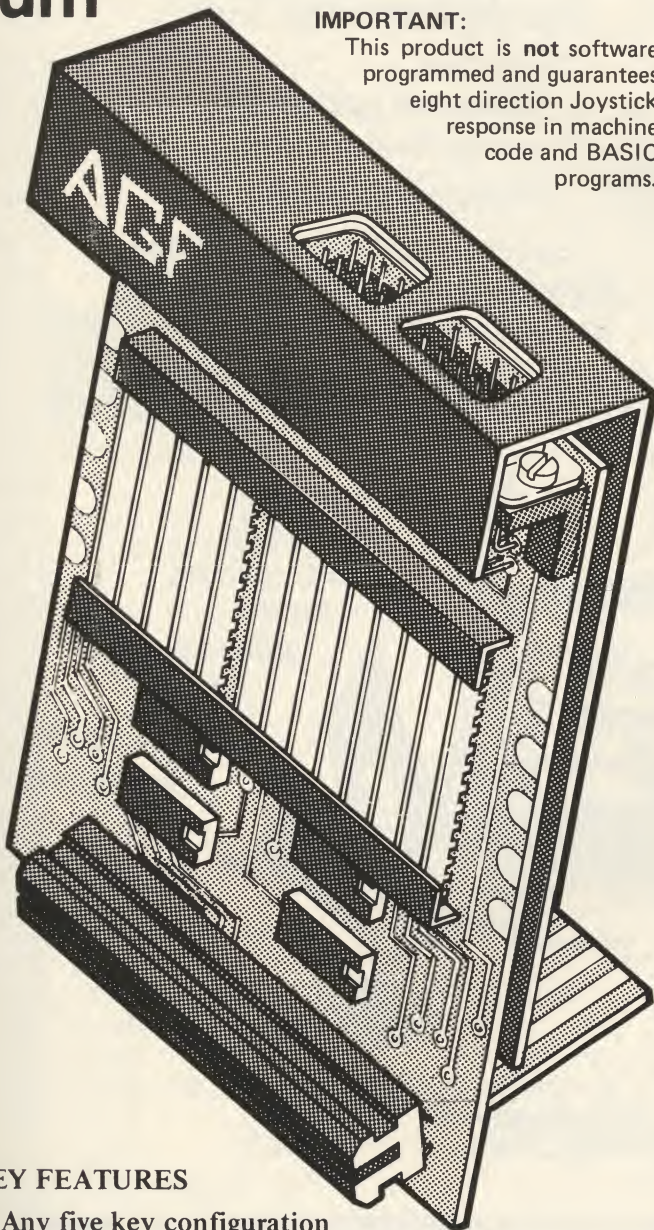
Spectrum

RE

!

IMPORTANT:

This product is not software programmed and guarantees eight direction Joystick response in machine code and BASIC programs.



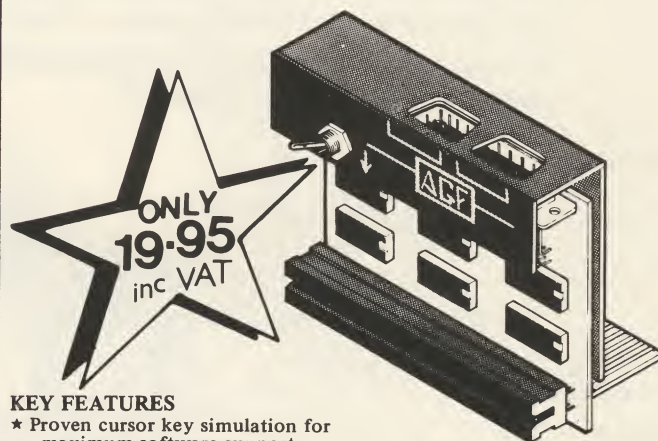
KEY FEATURES

- Any five key configuration programmed onto joystick
- Accepts all Atari-compatible Joysticks
- Rear connector for any other add-ons
- Use will not affect Sinclair guarantee
- Full instructions & 12 month guarantee

JOYSTICK INTERFACE II

for

sinclair ZX Spectrum 81



KEY FEATURES

- ★ Proven cursor key simulation for maximum software support
- ★ Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick, etc.
- ★ Second Joystick facility
- ★ Eight directions programmed in simple BASIC
- ★ Rear extension connector for all other add-ons
- ★ Free demo program, 'Video Graffiti' + full instructions

JOYSTICKS

ATARI CONTROLLERS
FOR USE WITH OUR INTERFACE
Module II or VIC 20, Commodore 64,
Atari VCS, Atari 400, Atari 800
If you require extra Joysticks for our
original interface module mark order
'OLD' Joysticks
ONLY £7.54 inc VAT + P&P

INTERFACE II COMPATIBLE SOFTWARE

ZX SPECTRUM			
Abbex ...	* Spookyman	Hewson ...	Nightflite
	* Invasion	Consultants	Specvaders
	* Harrier	ICL ...	Mazechase
	* Cosmos		Star Trail
	* The Android Run	Imagine ...	(Man.Dock)
	* High Noon	Micromania	Zzoom
	* ETX	New Generation	Ghost's Revenge
Abersoft ...	Mazeman	Software	Escape £4.95
	The Wizards	Newsoft ...	3D Tunnel £5.95
	Warriors	Products	Knot in 3D £5.95
Apocalypse Software ...	Galactic Jailbreak	Psion ...	Time Bandits
Axis ...	Labyrinth		Spectral Maze
Blaby Comp. & Vid. ...	Chopper Rescue	Quicksilva	Flight Simulation
	Gold Digger	R + R ...	VU-3D
	Confusion	Software	Meteor Storm
Campbell Systems ...	Gulpman	Silversoft ...	Space Intruders
CDS Micro Systems ...	Leapfrog		Gnasher
C.Tech ...	Specman	Vectis ...	Spectapede
DJL Software	Froggy	Software	Ground Attack
DK 'Tronics	3D Tanx £4.95		Cyber Rats £5.95
	Meteoroids		Pony Express
			Vec-Man

LATEST ADDITION

Digital Integration . . .
Night Gunner & Fighter Pilot

* State "AGF version"

"PLUS 21 ZX81 Titles"

We are pleased to say that future software support commitment for the AGF Interface II has been negotiated from many of the companies listed above.

For example all new titles from Imagine, commencing with Zzoom, will be compatible and carry the compatibility logo, shown below, on their packaging. This new logo scheme will help you select software that is guaranteed compatible and is also being adopted by many of the supporting suppliers.

At the time of printing it is hoped that pending releases from Bug-Byte will enjoy AGF compatibility.



AGF Hardware, 26 Van Gogh Place, Bognor Regis, West Sussex PO22 9BY

RICHARD SHEPHERD SOFTWARE

£1,000 REWARD

For the most exciting adventure game you have ever created.

We are: Richard Shepherd Software. We Offer: The Largest range of top quality, original adventures for the Spectrum.

We are searching: For unusual and original adventure games — but we only want the best — No old-hat, old-style arcade games for us! we want to see great graphics, amazing animation and spectacular sound effects!

If you've got what we're looking for ...

We want to see it!

Exceptional games will be added to our range and the author rewarded with up to £1,000 !!! in cash !!!

Send samples of your very best games to the address below... don't wait ... act now!

We need games for:

Spectrum
Dragon
Oric
BBC
Commodore
(VIC20
& 64)



PLEASE NOTE: OUR DECISION WILL BE FINAL — NO CORRESPONDENCE WILL BE ENTERED INTO. PLEASE ENSURE THAT YOUR NAME AND ADDRESS APPEAR ON THE TAPE TO ALLOW US TO CONTACT YOU SHOULD YOUR GAME BE CHOSEN.

RICHARD SHEPHERD SOFTWARE
FREEPOST, MAIDENHEAD, BERKS SL6 5BY.

PROGRAM PRINTOUT



KEN RYLETT of Burnage, Manchester wrote **Solitaire** for the 16K Spectrum to allow people to play the traditional game. Move one spot over the next to an empty space. The peg which has been jumped will then disappear. The aim is to finish with only one spot remaining. Moves should be entered as number, then letter.

Letters to be entered in graphics mode are underlined>.

```

1015 GO SUB 9000
1020 BORDER 5: PAPER 5: INK 0:
      CLS
1030 FOR n=1 TO 64
1040   LET P(n)=1
1050   PRINT BRIGHT 1: INK 2:
        AT V(n),H(n): "a"
1060 NEXT n
1070
1080 FOR n=20 TO 148 STEP 16
1090   PLOT 60,n: DRAW 128,0
1100 NEXT n
1110
1120 FOR n=60 TO 188 STEP 16
1130   PLOT n,20: DRAW 0,128
1140 NEXT n
1150
1160 PRINT AT 2,8: "A B C D E F G
      H"
1170
1180 PRINT AT 4,6:1:AT 6,6:2:AT
      8,6:3:AT 10,6:4:AT 12,6:5:AT 14,
      6:6:AT 16,6:7:AT 18,6:8
1190
1200 PRINT AT V(28),H(28):" ":AT
      V(29),H(29):" ":AT V(36),H(36):
      " ":AT V(37),H(37):" "

```

```

1210 LET P(28)=0: LET P(29)=0:
      LET P(36)=0: LET P(37)=0
1220 LET moves=0: LET pegs=60
1230 PRINT PAPER 1: BRIGHT 1:
      INK 7:AT 0,0:"MOVES=":moves:AT 0
      ,25:"PEGS=":pegs:AT 4,0: PAPER 6
      : INK 0: BRIGHT 1:"INPUT":AT 5,0
      : "99 TO":AT 6,0:"QUIT."

```

```

1240 PRINT PAPER 6: INK 0: BRIGH
      T 1:AT 9,0:"ONLY ":AT 10,0:"bc d
      e":AT 11,0:"fg hi"
2020 INPUT PAPER 0: INK 7: BRIGH
      T 1:"MOVE FROM ? ": LINE F$
2025 IF F$="99" THEN GO TO 3560
2030 IF F$(1)<"1" OR F$(1)>"8"
      OR F$(2)<"A" OR F$(2)>"H"
      THEN BEEP 1,1: PRINT PAPER
      2: INK 7: BRIGHT 1: FLASH 1:AT
      20,0: "ONLY NUMBER THEN LETTER
      e.g. 2A": FOR n=1 TO 250: NEXT
      n: PRINT AT 20,0:"

```

" : GO TO 2020

" : GO TO 2020

```

2035 PRINT PAPER 1: BRIGHT 1:
      INK 7: FLASH 1:AT 10,25:"FROM ":
      F$

```



```

2040 INPUT PAPER 0; INK 7; BRIGH
T 1; "MOVE TO ? "; LINE T$
2045 IF T$="99" THEN GO TO 3560
2050 IF T$(1)<"1" OR T$(1)>"8"
    OR T$(2)<"A" OR T$(2)>"H"
    THEN BEEP 1,1: PRINT PAPER
2; INK 7; BRIGHT 1; FLASH 1; AT
20,0; "ONLY NUMBER THEN LETTER
e.g. 2A"; FOR n=1 TO 250: NEXT
n: PRINT AT 20,0; "
    ": GO TO 2040

2055 PRINT PAPER 1; BRIGHT 1;
INK 7; FLASH 1; AT 12,25; " TO ";
T$
2060
2070 LET f=((CODE F$(1)-49)*8)+(
CODE F$(2)-64)
2080 LET t=((CODE T$(1)-49)*8)+(
CODE T$(2)-64)

2090 IF P(f)=0 OR P(t)=1 THEN
BEEP 1,1: PRINT PAPER 2; INK 7;
BRIGHT 1; FLASH 1; AT 20,6; "
INVALID MOVE " : FOR n=1 TO 250
: NEXT n: PRINT AT 20,6; "
    ": AT 10,25; "
    ": GO TO 2020

2100
2110 LET diffv=V(f)-V(t)
2115 LET diffh=H(f)-H(t)
2120 IF diffh= 4 AND diffv=0
THEN GO TO 3100
2130 IF diffh=-4 AND diffv=0
THEN GO TO 3200
2140 IF diffv= 4 AND diffh=0
THEN GO TO 3300
2150 IF diffv=-4 AND diffh=0
THEN GO TO 3400

2160 BEEP 1,1: PRINT PAPER 2;
INK 7; BRIGHT 1; FLASH 1; AT 20,6
; " INVALID MOVE " : FOR n=1
TO 250: NEXT n: PRINT AT 20,6; "
    ": AT 10,25; "
    ": GO TO
2020

3120 BEEP 1,1
3125 IF P(t+1)=0 THEN GO TO 4000
3130 PRINT INK 2; AT V(t),H(t); "a
": AT V(t),H(t+1); " ": AT V(f),H(f
); " "
3140 LET P(t)=1: LET P(t+1)=0:
LET P(f)=0
3150 GO TO 3500
3220 BEEP 1,1
3225 IF P(t-1)=0 THEN GO TO 4000
3230 PRINT INK 2; AT V(t),H(t); "a
": AT V(t),H(t-1); " ": AT V(f),H(f
); " "
3240 LET P(t)=1: LET P(t-1)=0:
LET P(f)=0
3250 GO TO 3500
3320 BEEP 1,1
3325 IF P(t+8)=0 THEN GO TO 4000
3330 PRINT INK 2; AT V(t),H(t); "a
": AT V(t+8),H(t); " ": AT V(f),H(f
); " "
3340 LET P(t)=1: LET P(t+8)=0:
LET P(f)=0
3350 GO TO 3500
3420 BEEP 1,1
3425 IF P(t-8)=0 THEN GO TO 4000
3430 PRINT INK 2; AT V(t),H(t); "a
": AT V(t-8),H(t); " ": AT V(f),H(f
); " "
3440 LET P(t)=1: LET P(t-8)=0:
LET P(f)=0
3520 LET moves=moves+1
3530 LET Pe9s=Pe9s-1
3540 PRINT PAPER 1; INK 7; BRIGH
T 1; AT 0,31; " ": AT 0,6; moves; AT
0,30; Pe9s
3550 IF Pe9s>1 THEN PRINT AT 10,
25; "
    ": AT 12,25; "
    ":
GO TO 2020

3560 INPUT PAPER 0; INK 7; BRIGH
T 1; FLASH 1; "END OF GAME , ANOT
HER ? "; LINE A$: IF A$="" THEN
GO TO 3560
3565 IF A$="Y" THEN GO TO 1020
3570 STOP
3580
4000 REM INVALID MOVE
4010
4020 PRINT PAPER 2; INK 7; BRIGH
T 1; FLASH 1; AT 20,8; " INVALID M
OVE " : FOR n=1 TO 250: NEXT n: P
RINT AT 20,8; "
    ": AT
10,25; "
    ": AT 12,25; "
    ": GO TO 2020

4030
9000 REM SET UP
9010
9020 DIM P(64)
9030 DIM V(64): DIM H(64)
9035 DIM F$(2): DIM T$(2)

9050 FOR n=0 TO 7
9060 READ a: POKE USR "A"+n,a
9070 NEXT n
9080 DATA 60,126,255,255,255,255
,126,60
9100 FOR n=1 TO 8
9110 LET V(n)=4
9120 LET V(n+8)=6
9130 LET V(n+16)=8
9140 LET V(n+24)=10
9150 LET V(n+32)=12
9160 LET V(n+40)=14
9170 LET V(n+48)=16
9180 LET V(n+56)=18
9190 NEXT n
9210 FOR n=1 TO 57 STEP 8
9220 LET H(n)=8
9230 LET H(n+1)=10
9240 LET H(n+2)=12

9250 LET H(n+3)=14
9260 LET H(n+4)=16
9270 LET H(n+5)=18
9280 LET H(n+6)=20
9290 LET H(n+7)=22
9300 NEXT n
9320 POKE 23658,8
9340 FOR n=0 TO 7
9350 READ b: POKE USR "B"+n,b
9360 READ c: POKE USR "C"+n,c
9370 READ d: POKE USR "D"+n,d
9380 READ e: POKE USR "E"+n,e
9390 READ f: POKE USR "F"+n,f
9400 READ g: POKE USR "G"+n,g
9410 READ h: POKE USR "H"+n,h
9420 READ i: POKE USR "I"+n,i
9430 NEXT n

9440 DATA 0,0,0,0,127,254,1,128,
0,0,1,128,40,12,1,128,0,0,3,192,
24,24,1,128,0,0,7,224,0,0,5,160,
0,0,5,160,0,0,7,234,24,24,1,128,
0,0,3,192,40,12,1,128,0,0,1,128,
127,254,1,128,0,0,1,0
9450
9460 RETURN

```



ROLE REVERSAL



ENTHUSIASTIC Sinclair programmers are all familiar with the experience of being chased round the screen by more or less intelligent ghosts.

David Gibbs of Sutton Coldfield, West Midlands has provided an oppor-

tunity for 1K ZX-81 owners to reverse their roles and chase the ghost round the screen.

The ghost has an advantage, in that it can walk off one side of the screen and re-appear on the other. Move using the usual cursor keys.

```

W ^ 1 LET C=INT (RND*32)
5 LET A=INT (RND*21)
10 LET Z=10
15 LET T=0
20 LET B=0
40 LET B=B+(INKEY$="B")-(INKEY
$="5")
45 LET Z=Z+(INKEY$="6")-(INKEY
$="7")
46 LET T=T+1
50 CLS
60 IF Z=A AND B=C THEN GOTO 20
0
70 PRINT AT A,C;"(i)" AT Z,B)
"(i<)"
80 LET M=INT (RND*3)
90 LET C=C+(M=1)-(M=2)
100 LET A=A+(M=3)-(M=0)
110 IF M=3 THEN LET A=A+1

```

```

120 PRINT AT Z,B;"(i-)"
130 IF C=32 THEN LET C=1
140 IF C=0 THEN LET C=31
140~IF C=0 THEN LET C=31
150 IF A=21 THEN LET A=1
160 IF A=0 THEN LET A=20
180 GOTO 30
200 PRINT AT 0,0;"YOU TOOK "T;
" MOVES TO CATCH HIM"
210 LET D=10
220 FOR C=1 TO D
230 PRINT AT Z,B;"(i<)"
240 NEXT C
250 LET D=D-1
260 FOR C=1 TO D
270 PRINT AT Z,B;"(i-)"
280 NEXT C
290 IF D>0 THEN GOTO 220
300 PRINT AT Z,B+1;"BURP"

```



```

10 FOR A=1 TO 352
20 PRINT "(2*isp)";
30 NEXT A
40 PRINT AT 1,6;"(9h)";AT 2,5;
"(3*9h)";AT 3,4;"(5*9h)"
50 PRINT AT 4,5;" " "AT 5,5;"
"AT 6,5;"(9wisp:99)"
60 PLOT 11,34
70 PLOT 14,34
80 PLOT 12,32
90 PLOT 13,32
100 FOR B=4 TO 7
110 PRINT AT B,2;"(9h)"
120 NEXT B
130 PRINT AT 7,3;"(2*9h:isp:99:
isp:3*9h)"
140 FOR D=8 TO 14
150 PRINT AT D,4;"(5*9h)"
160 NEXT D
180 PRINT AT 9,6;"(isp)";AT 11,
6;"(isp)"
190 FOR E=14 TO 19
200 PRINT AT E,3;"(3*9h:isp:3*9h
)"
210 NEXT E
220 PRINT AT 16,2;"(9h)";AT 16,
10;"(9h)";AT 17,2;"(9h)";AT 17,1
0;"(9h)"
230 PRINT AT 20,4;" " "AT 20,7;
" "
240 PRINT AT 8,10;"(9h)";AT 9,1
0;"(9h)";AT 10,10;"(9h)";AT 11,9
;"(sp:9h)"
250 PRINT AT 1,15;"hello childr
en"
260 FOR F=1 TO 100
270 PRINT AT 3,2;" " "AT 3,2;"(i
sp)"
280 NEXT F
290 PRINT AT 3,2;" "
300 PRINT AT 3,10;"my name is c
edric the"
310 PRINT AT 5,18;"clown"
320 PRINT AT 7,12;"i am going t
o ask";AT 9,12;"you some easy su
ms"
330 PAUSE 300
340 PRINT AT 3,10;"(21*isp)"
350 PRINT AT 5,18;"(5*isp)"
360 PRINT AT 7,12;"(17*isp)";AT
9,12;"(18*isp)"
370 PRINT AT 1,15;"(14*isp)"
380 LET I=0
390 LET J=0
400 LET G=INT (RND*10)
405 LET H=INT (RND*10)
410 PRINT AT 1,12;G;"+";H;"="
415 LET X=G+H
420 INPUT K
430 IF K=G+H THEN PRINT AT 1,18

```



PAUL ASKEW of Worksop, Nottinghamshire embellished a simple mathematics test program for children with some very professional graphics. Cedric is a clown who likes to help children with their arithmetic. He will ask simple sums involving addition and subtraction and will give the correct answer if the incorrect one is input. (16K ZX-81).

CEDRIC THE CLOWN


```

J,K;" correct"
440 IF K<>G+H THEN PRINT AT 1,1
B;K;" wrong";AT 3,12;"the ans
wer is";X
450 IF K=G+H THEN LET I=I+1
460 LET J=J+1
475 PAUSE 300
480 PRINT AT 1,12;"(19*isp)";AT
3,12;"(17*isp)"
485 IF J=10 THEN GOTO 500
490 GOTO 400
500 PRINT AT 1,12;"so far you h
ave";AT 3,12;" got ";I;" right"
510 PAUSE 200
515 PRINT AT 1,12;"(16*isp)";AT
3,12;"(18*isp)"
520 LET I=I
525 LET J=J
530 LET L=INT (RND*5)+5
540 LET M=INT (RND*5)
550 LET N=L-M
560 PRINT AT 1,12;L;"-";M;"="
570 INPUT O
580 IF O=L-M THEN PRINT AT 1,18
J,O;" correct"
590 IF O<>L-M THEN PRINT AT 1,1
B,O;" wrong";AT 3,12;"the ans
wer is";N
600 PAUSE 200
610 PRINT AT 1,12;"(17*isp)";AT
3,12;"(19*isp)"

```

```

620 IF O=L-M THEN LET I=I+1
625 LET J=J+1
630 IF J=20 THEN GOTO 650
640 GOTO 530
650 IF I>=0 AND I<5 THEN PRINT
AT 1,12;"ask your dad to help";A
T 3,12;"you with your maths"
660 IF I>=5 AND I<10 THEN PRINT
AT 1,12;"you need to study more
"
670 IF I>=10 AND I<15 THEN PRIN
T AT 1,12;"well done"
680 IF I>=15 AND I<=19 THEN PRI
NT AT 1,12;"very well done"
690 IF I=20 THEN PRINT AT 1,12;
"excellent"
700 PRINT AT 5,12;"would you li
ke";AT 7,12;"another go (y\n)"
710 INPUT A$
720 IF A$="Y" THEN GOTO 10
730 IF A$="N" THEN GOTO 740
740 PRINT AT 1,12;"(16*isp)";AT
3,12;"(17*isp)";AT 5,12;"(19*is
p)";AT 7,12;"(20*isp)"
745 PRINT AT 1,12;"goodbye"
750 FOR Z=1 TO 100
760 PRINT AT 3,2;" ";AT 3,2;"(i
sp)"
770 NEXT Z
780 PRINT AT 20,15;"end of progr
am"

```



PHILIP MEADE of Chippenham, Wiltshire wrote this short and simple **Telephone** routine to simulate a telephone ringing on the

Spectrum. The sound could be inserted in a game or used, as it was here, to infuriate others in the office.

```

10 LET a=10: LET b=0.015
20 FOR c=0 TO 10: BEEP b,a: NE
XT c
30 PAUSE 10

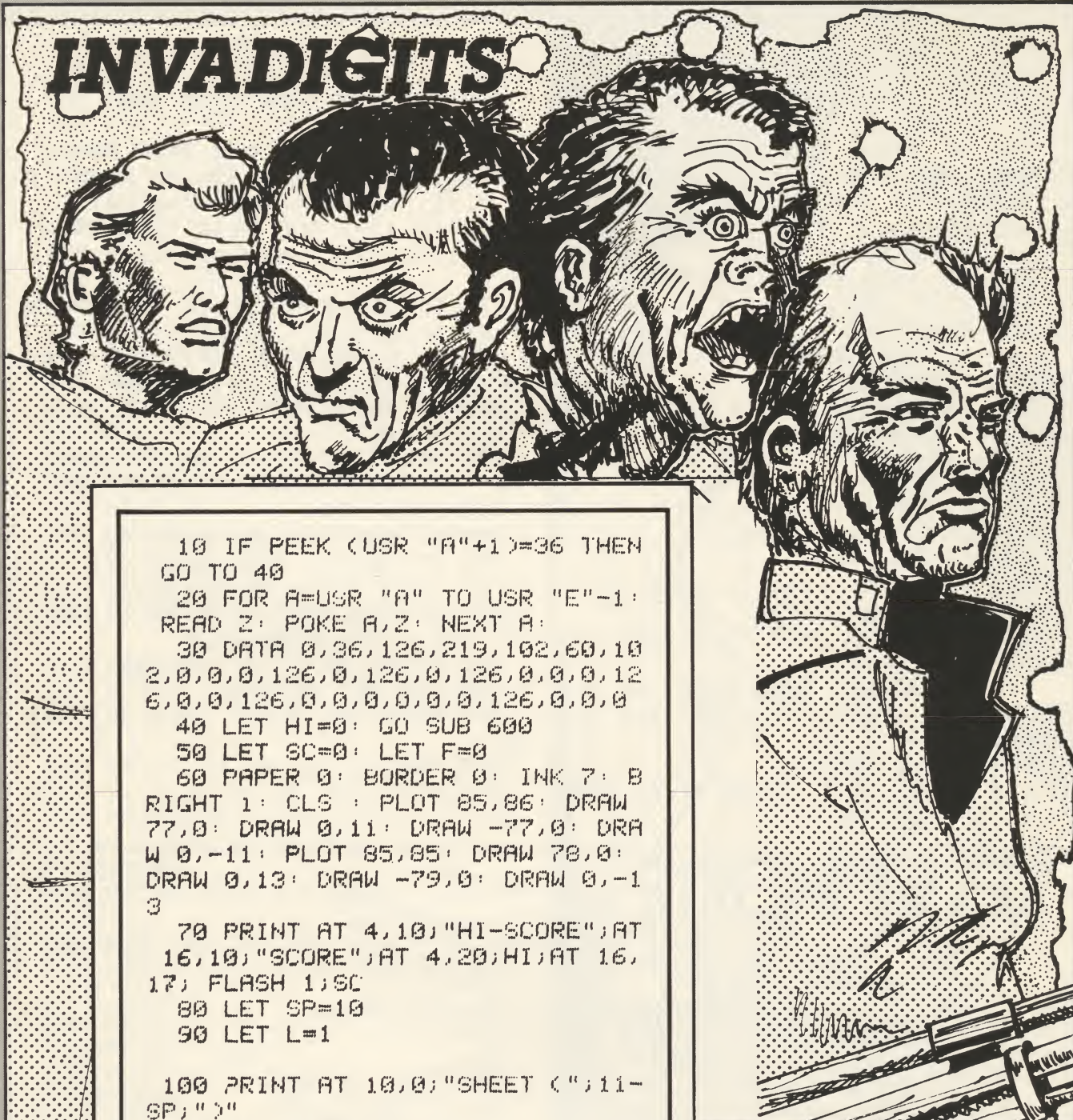
```

```

40 FOR c=0 TO 10: BEEP b,a: NE
XT c
50 PAUSE 60
60 GO TO 10

```


INVADIGITS



```

10 IF PEEK (USR "A"+1)=36 THEN
GO TO 40
20 FOR A=USR "A" TO USR "E"-1:
READ Z: POKE A,Z: NEXT A:
30 DATA 0,36,126,219,102,60,10
2,0,0,0,126,0,126,0,126,0,0,0,12
6,0,0,126,0,0,0,0,0,126,0,0,0
40 LET HI=0: GO SUB 600
50 LET SC=0: LET F=0
60 PAPER 0: BORDER 0: INK 7: B
RIGHT 1: CLS : PLOT 85,86: DRAW
77,0: DRAW 0,11: DRAW -77,0: DRA
W 0,-11: PLOT 85,85: DRAW 78,0:
DRAW 0,13: DRAW -79,0: DRAW 0,-1
3
70 PRINT AT 4,10;"HI-SCORE";AT
16,10;"SCORE";AT 4,20;HI;AT 16,
17; FLASH 1;SC
80 LET SP=10
90 LET L=1

100 PRINT AT 10,0;"SHEET (";11-
SP;")"
110 LET HT=0
120 LET I=0
130 LET SH=0
140 LET A$=""
150 LET N=0
160 PRINT AT 10,11;"0 ";CHR$(L
+144);" "
170 LET G=HT
180 IF L=1 THEN FOR G=0 TO 16
190 PRINT AT 10,20-LEN A$-F)A$
200 FOR B=1 TO SP
210 PAUSE 5
220 LET N=N+(INKEY$="1"): IF N=
11 THEN LET N=0
230 PRINT AT 10,11;(STR$ N AND
N<10);("a" AND N=10)
240 IF INKEY$<>"0" THEN GO TO 3

```

Continued next page

MATCH THE FIGURE on the left with that on the right. Advance the figure on the left by pressing "1" and press "0" when the figures are identical. Clear a sheet of 16 figures for an increase in speed and a bonus. Clear eight sheets for another bonus and a slightly more difficult game.

The sooner you match your numbers, the higher your score. Match a space invader to gain an extra 300 points. The game ends when three lives are lost or more than 30 shots are fired in one sheet.

Peter Bernstein of Northwood, Middlesex, who wrote the game for the 16K Spectrum, says his highest score is 25,490.

60

```
250 LET SH=SH+1: IF SH=30 THEN
GO TO 430
```

```
260 FOR A=1 TO LEN A$: IF A$(A)
=STR$ N OR (A$(A)="a" AND N=10)
THEN GO TO 290
```

```
270 NEXT A
```

```
280 BEEP .08,-10: GO TO 360
```

```
290 LET SC=SC+(6-LEN A$+A-F)*10
*(F+1): IF N<>10 THEN LET I=I+N:
GO TO 310
```

```
300 LET SC=SC+300
```

```
310 LET HT=HT+1
```

```
320 LET A$=A$( TO A-1)+A$(A+1 T
O )
```

```
330 IF N<>10 THEN BEEP .09,20:
GO TO 350
```

```
340 FOR W=45 TO 20 STEP -3: BEE
P .01,W: NEXT W
```

```
350 PRINT AT 10,14: " " AT
10,20-LEN A$-F:A$ AT 16,17: FLAS
H 1:SC
```

```
360 IF A$=" " ( TO LEN A$)
AND G=16 THEN GO TO 520
```

```
370 NEXT B
```

```
380 LET B$=STR$ (INT (RND*10)):
IF I/10=INT (I/10) AND I<>0 THE
N LET B$="a": LET I=0
```

```
390 IF G=16 THEN LET G=15: LET
B$=" "
```

```
400 LET A$=A$+B$
```

```
410 IF LEN A$<7-F THEN NEXT G
```

```
420 IF L<3 THEN PRINT AT 10,11:
FLASH 1: BRIGHT 1: "(9*96)": BEE
P 2,-20: LET L=L+1: GO TO 140
```

```
430 PRINT AT 10,11: BRIGHT 1: F
LASH 1: "GAME OVER"
```

```
440 FOR A=0 TO -40 STEP -1: BEE
```

```
P .05,A+(RND*3-1): NEXT A
```

```
450 IF HI<SC THEN LET HI=SC
```

```
460 PRINT AT 20,7: "ANOTHER GO ?
(Y/N)"
```

```
470 PAUSE 0: LET I$=INKEY$
```

```
480 IF I$="Y" OR I$="y" THEN BE
EP .5,10: GO SUB 620: GO TO 50
```

```
490 IF I$<>"N" AND I$<>"n" THEN
GO TO 470
```

```
500 STOP
```

```
510 NEXT G
```

```
520 PRINT AT 10,11: FLASH 1: "(9
*198)"
```

```
530 FOR T=1 TO 3: BEEP .1,10: B
EEP .05,20: BEEP .1,15: BEEP .1,
10: NEXT T
```

```
540 LET SP=SP-1: IF SP>2 THEN G
O TO 90
```

```
550 LET SP=11
```

```
560 PRINT AT 10,11: FLASH 1: "
BONUS "
```

```
570 FOR A=-20 TO 19: LET SC=SC+
10: PRINT AT 16,17:SC: BEEP .1,A
: NEXT A
```

```
580 LET F=F+0
```

```
590 GO TO 80
```

```
600 PAPER 7: INK 0: BORDER 7: B
RIGHT 0: CLS
```

```
610 PRINT AT 5,10: "INVADIGITS":
TAB 10: "(10*93)": AT 10,6: "" "1"
ADVANCE NUMBER": AT 14,6: "" "0"
FIRE"
```

```
620 PRINT AT 20,4: FLASH 1: BRI
GHT 1: "PRESS ANY KEY TO START"
```

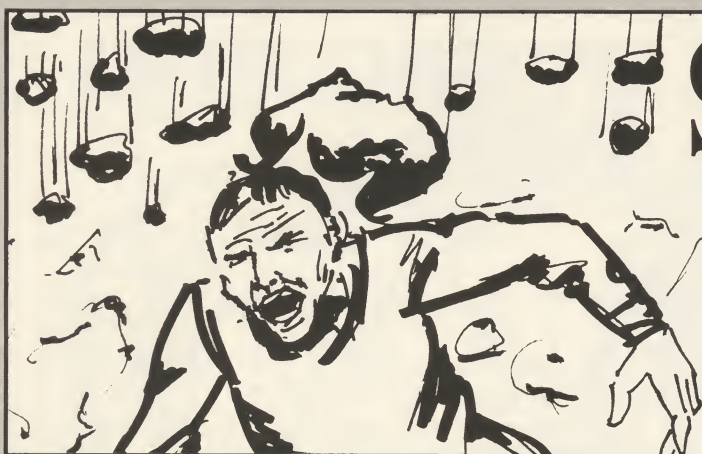
```
630 GO TO 630+(INKEY$<>"")
```

```
640 CLS
```

```
650 RETURN
```



STORM



```

1 REM (MACHINE CODE-188 CH
6 PRINT "WHEN THE LAST PAIR H
AS BEEN ENTERED ENTER (S)"
10 LET A$=""
20 LET X=16520
30 IF A$="" THEN INPUT A$
40 IF A$="S" THEN STOP
50 SCROLL
60 PRINT A$( TO 2),X
70 POKE X,16*CODE A$+CODE A$(2
)-476
80 LET A$=A$(3 TO )
90 LET X=X+1
100 GOTO 30
10 PRINT AT 0,0;"00000000 VVV
storm"
20 POKE 16418,0
30 FOR N=1 TO 23
40 PRINT "
"
50 NEXT N
60 POKE 16418,2
70 PRINT AT 10,3;"ENTER LEVEL
OF DIFFICULTY"
80 INPUT A
90 IF A>255 THEN GOTO 80
100 POKE 16654,A
105 PRINT AT 10,3;"      ENTER
SPEED      "
110 INPUT A
120 IF A>255 THEN GOTO 110
130 POKE 16690,A
135 PRINT AT 10,3;"
"
136 FOR N=1 TO 50
137 IF INKEY$("<>") THEN GOTO 140
138 NEXT N
140 RAND USR 16520
150 PRINT AT 10,10;"GAME OVER";
AT 20,9;"PRESS A KEY"
160 IF INKEY$("<>") THEN GOTO 160
170 IF INKEY$="" THEN GOTO 170
180 RUN
190 SAVE "STORM"
200 RUN

```



YOU ARE situated at the top of the screen. Avoid the storm of black squares rushing at you by moving left and right with keys "1" and "0". At the start of the game you are asked to enter your speed and difficulty level. Entering "5" for both produces a reasonably fast game.

C Hornby of Hassocks, Sussex speeded the game by writing part of it in machine code. Enter the short initial program. RUN it, then enter the series of numbers two at a time, working from left to right, entering "S" to end the series. RUN the program again, delete all lines except line one, and then enter the main program. (16K ZX-81).

PETE THE PARTY GOER



YOU PLAY the part of cheerful Pete who, to bring some happiness into the lives of his fellow party-goers, is bouncing balloons on his tennis racquet. The others at the party have threatened that if Pete fails and misses his balloons they will eat him. Prolong Pete's life by moving him left and right with keys "1" and "0".

Pete the Party-goer was written for the 16K Spectrum by J Smith of Coulsdon, Surrey.

```

1 REM xxxxxxxxxxxxxxxx
2 CLS : LET n$="spectrum"
3 LET hi=0
4 GO SUB 1000
5 LET sc=0
6 LET c=1: LET li=3
7 PRINT AT 11,0;"Instructions
(y/n)"
8 PAUSE 0
10 IF INKEY$="y" THEN GO SUB 2
020
11 DEF FN h()=2*(SGN ((PEEK (J
+2345))- (PEEK (J+8976))))
20 PRINT AT 21,0;"level 1-3?":
PAUSE 0: LET l$=INKEY$
21 IF l$>"3" OR l$<"1" THEN BE
EP .5,-40: GO TO 20
23 CLS
24 PRINT TAB 6;"SCORE:";sc;TAB
16;"HIGH:";hi;TAB 25;"LIVES:";l
i
25 LET l=VAL l$
40 LET i=1
50 DIM a(1+1,2)
60 FOR n=1 TO 1+1
70 LET a(n,1)=INT (RND*5)+6
80 LET a(n,2)=1
85 IF RND>.6 THEN LET a(n,2)=a
(n,2)/2

```

```

90 PRINT AT a(n,1),n*2; INK n;
"0"
100 NEXT n
105 PLOT 0,23: DRAW 131,0: GO S
UB 3020
110 LET x=18: LET y=0: LET sc=0
120 FOR n=1 TO 1+1
121 BEEP .0001,60
130 PRINT AT a(n,1),n*2;" "
140 LET a(n,1)=a(n,1)+a(n,2)
150 IF a(n,1)<6+(INT (RND*4)) T
HEN LET a(n,2)=-a(n,2)
160 IF a(n,1)>=19+a(n,2) THEN L
ET li=li-1: BEEP .1,-30: LET a(n
,1)=6: GO SUB 3000: PRINT AT 0,3
1;li: IF li=0 THEN GO TO 250
170 PRINT AT a(n,1),n*2; INK n;
"0"
180 NEXT n
190 IF c=1 THEN IF sc=16 THEN G
O SUB 2000
200 PRINT AT x-2,y+1;" " ;AT x-1
,y+1;" " ;AT x,y;" "
210 LET y=y+(INKEY$="0" AND y<1
5)-(INKEY$="1" AND y>0)
220 PRINT AT x-2,y+1; INK 2;"d"
; INK 0;AT x-1,y+1;"b";AT x,y;"c
a"
225 IF INKEY$="h" THEN PAUSE 30

```



```

: PAUSE 0
230 IF SCREEN$(x-1,y)="0" THEN
  LET a(y/2,2)=-a(y/2,2): LET sc=
sc+1: BEEP .01,30: PRINT AT 0,5:
"SCORE:";sc;TAB 16;"HIGH:";hi
240 GO TO 120
251 LET P$=CHR$ 22+CHR$ 0+CHR$
0+"tough luck you ran out of liv
es."+CHR$ 13+"score:"+STR$ sc
252 GO SUB 270
253 LET P$=CHR$ 22+CHR$ 3+CHR$
0+"CHOMP, MUNCH, SHLURP"+CHR$ 13
+"DELICIOUS!!!!"
254 GO SUB 270: FOR n=24 TO 1 S
TEP -1: PLOT y*8+8,23+n: DRAW IN
VERSE 1;24,0: NEXT n: PRINT AT x
,y: OVER 1;"c": PLOT y*8,39: DRA
W 16,0
255 IF sc>hi THEN LET hi=sc: LE
T P$=CHR$ 22+CHR$ 9+CHR$ 0+"NEW
HIGH SCORE!!!!!!": GO SUB 270: FO
R e=1 TO 5: RANDOMIZE USR 23760:
NEXT e: BORDER 7: INPUT "your n
ame please ";n$
260 LET P$=CHR$ 22+CHR$ 11+CHR$
0+"high score is "+STR$ hi+" by
"+n$
261 GO SUB 270
262 IF SCREEN$(9,0)="N" THEN P
RINT AT 16,0;"Save high score?":
PAUSE 0: LET o$=INKEY$: IF o$="
y" THEN SAVE "Pete" LINE 4
269 GO TO 320
270 FOR n=1 TO LEN P$
280 PRINT P$(n);
290 BEEP .01,60
300 NEXT n
310 RETURN
320 PRINT AT 13,0;"Again? "
321 PAUSE 30: PAUSE 0: LET o$=I
NKEY$
322 CLS
330 GO TO (340 AND NOT o$="y")+
(5 AND o$="y")
340 PRINT "O.K"
999 GO TO 9999
1000 DATA 24,60,90,154,24,24,36,
36
1001 DATA 36,60,66,82,194,114,36
,24
1002 DATA 0,0,0,31,28,0,0,0
1003 DATA 0,0,0,0,102,60,60,60
1004 RESTORE 1000
1010 FOR n=0 TO 31: READ a: POKE
USR "a"+n,a: NEXT n
1011 DATA 6,255,197,6,255,120,21
1,254,16,251,193,16,245,201
1012 FOR n=0 TO 13: READ a: POKE
23760+n,a: NEXT n
1020 RETURN

```

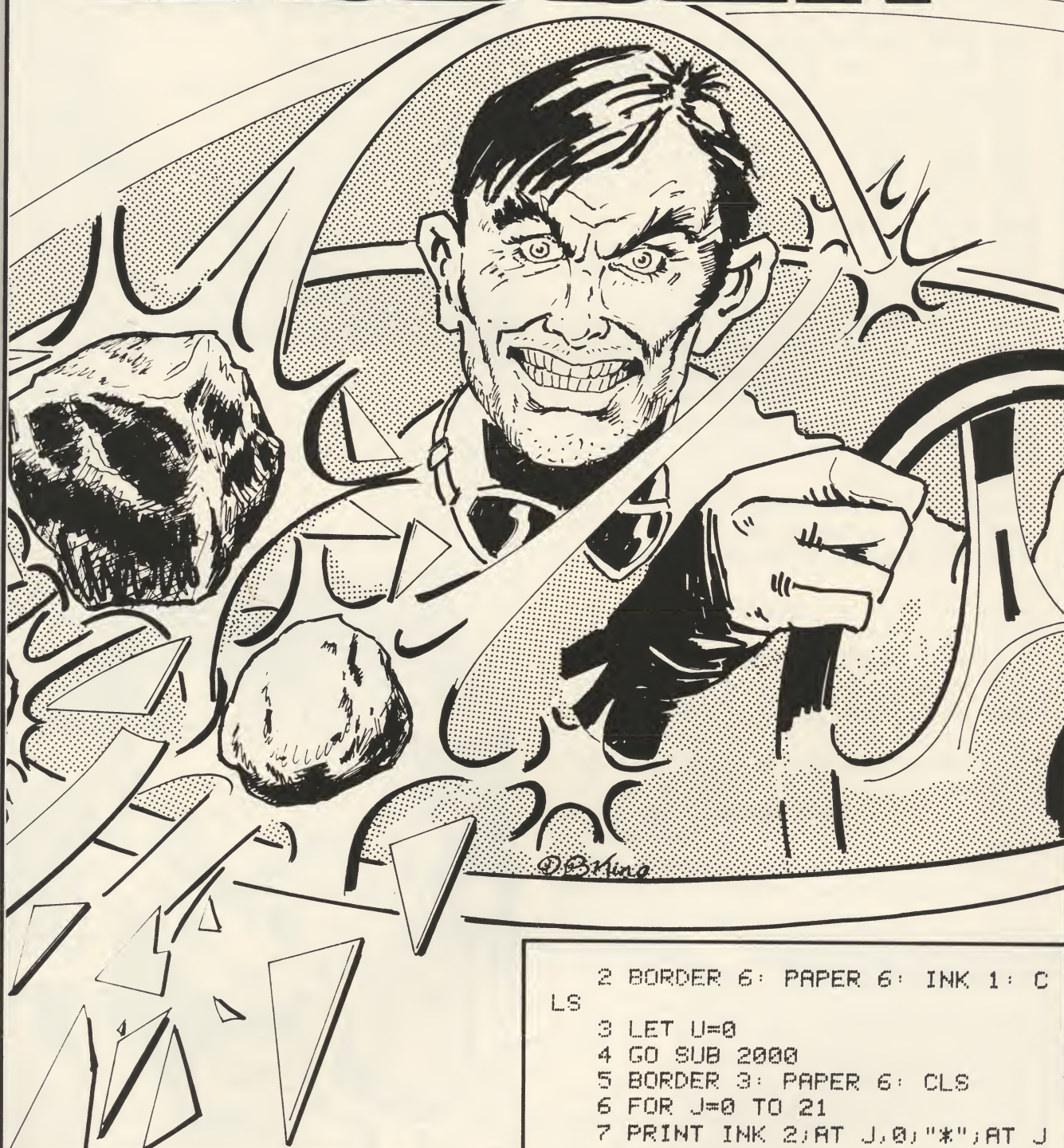
```

2000 FOR q=1 TO 1+1: LET a(q,2)=
1*SGN a(q,2): BEEP .1,q*2: NEXT
q
2005 LET c=0
2010 RETURN
2020 REM ffinstructionsff
2025 CLS
2030 PRINT 'TAB 6.5;"Pete the Pa
rty-goer"''' "You must move Pete:
''' "around using ""l"" to go le
ft"" "and ""r"" to go right"
2040 PRINT ' "Pete's job is to bo
unce the"" balloons (0) with his
tennis"" racket (c). "
2050 PRINT ' "His fellow Party-go
ers have said"" ""If you fail, W
e will eat you"" "
2060 PRINT ' "The food at this Pa
rty is so bad"" "that they will p
robably carry"" "out their threat
"
2070 PRINT AT 3,19: INK 2;"d": I
NK 0;AT 4,19;"b";AT 5,18;"ca"
2080 RETURN
3000 PLOT 0,23: DRAW 131,0
3010 PRINT AT x-2,y+1: INK 2;"d"
: INK 0;AT x-1,y+1;"b";AT x,y;"c
a"
3020 PLOT 0,5: DRAW 131,0
3030 PLOT 0,5
3040 FOR j=0 TO 130 STEP 6
3050 DRAW 3,13+FN h(): DRAW 3,-1
3-FN h()
3060 NEXT j
3065 PLOT 0,5: DRAW 0,18: PLOT 1
32,5: DRAW 0,18
3070 RETURN
4000 FOR h=0 TO 80 STEP 3
4010 PLOT h,150
4020 DRAW INK (RND*7)+1;20,0,RND
*PI
4030 NEXT h

```



DODGER



AVOID the missiles flying towards you by using cursor keys "5" and "8". Each time you avoid a batch you descend another level and the game becomes more difficult.

Adam Dangoor of Richmond, Surrey wrote **Dodger** for the 16K Spectrum.

```

2 BORDER 6: PAPER 6: INK 1: C
LS
3 LET U=0
4 GO SUB 2000
5 BORDER 3: PAPER 6: CLS
6 FOR J=0 TO 21
7 PRINT INK 2:AT J,0;"*":AT J
,31;"*"
8 NEXT J
9 PRINT AT 0,15;"HIGH SCORE:"
;U
10 PRINT AT 0,2;"LEVEL:"
15 RESTORE 15: FOR Z=0 TO 7: R
EAD A: POKEUSR "A"+Z,A: NEXT Z:
DATA 15,63,127,51,63,24,16,56
17 RESTORE 17: FOR Z=0 TO 7: R
    
```



```

HEAD A: POKE USR "B"+Z,A: NEXT Z:
DATA 240,252,254,204,252,24,8,2
8

```

```

20 RESTORE 20: FOR Z=0 TO 7: R
HEAD A: POKE USR "C"+Z,A: NEXT Z:
DATA 16,16,56,56,124,124,124,25
4

```

```

30 FOR a=1 TO 29 STEP 2
40 PRINT INK 0;AT 21,a;" "
50 NEXT a
780 LET X=3
789 LET H=0
790 LET Y=6
791 LET V=2
800 LET W=INT (RND*29)+1
802 LET V=V-1
803 IF V=0 THEN LET X=X+1: LET
V=3: IF X<10 THEN LET V=1
808 LET M=INT (RND*29)+1
809 LET N=INT (RND*29)+1
810 LET Q=INT (RND*29)+1
812 LET D=INT (RND*29)+1
815 LET F=INT (RND*29)+1
817 IF x>20 THEN GO TO 1990
830 LET Z=20
850 PRINT INK 1;AT X,Y;"AB"
855 PRINT AT 0,0;X
860 IF Y<1 OR Y>29 THEN GO TO 1
990

```

```

999 INK 0
1000 PRINT AT Z,Q;"C";AT Z,W;"C"
1001 PRINT AT Z,M;"C";AT Z,N;"C"
1002 PRINT AT Z,D;"C";AT Z,F;"C"
1020 PRINT AT Z,Q;" " ;AT Z,W;" "
1023 PRINT AT Z,M;" " ;AT Z,N;" "
1024 PRINT AT Z,D;" " ;AT Z,F;" "
1025 PRINT AT X,Y;" "
1027 IF Z=X THEN IF W=Y OR M=Y O
R N=Y OR Q=Y OR D=Y OR F=Y OR W=
Y+1 OR M=Y+1 OR N=Y+1 OR Q=Y+1 O
R D=Y+1 OR F=Y+1 THEN GO TO 1990
1028 IF INKEY$="8" THEN LET Y=Y+
1
1029 IF INKEY$="5" THEN LET Y=Y-
1
1030 LET Z=Z-1: IF Z<X THEN GO T
O 800
1040 GO TO 850
1992 IF X>U THEN LET U=X
1994 IF X<16 THEN LET R$="SPACE
CADET"
1995 IF X=15 OR X=14 THEN LET R$
="SOLDIER"
1996 IF X=17 OR X=16 THEN LET R$
="LIEUTENANT"
1997 IF X=19 OR x=18 THEN LET R$
="COMMANDER"
1998 IF X=20 OR X=21 THEN LET R$
="SPACE ADMIRAL"

```

```

1999 FOR I=-10 TO 40: BEEP .01,I
: NEXT I: BORDER 2: PRINT AT 6,5
: INVERSE 1;"YOU HAVE BEEN DESTR
OYED": PRINT AT 10,6;"RATING: "
R$: PAUSE 300: PRINT AT 16,3;"P
RESS ANY KEY TO CONTINUE": PAUSE
0: CLS : BORDER 6: GO TO 4

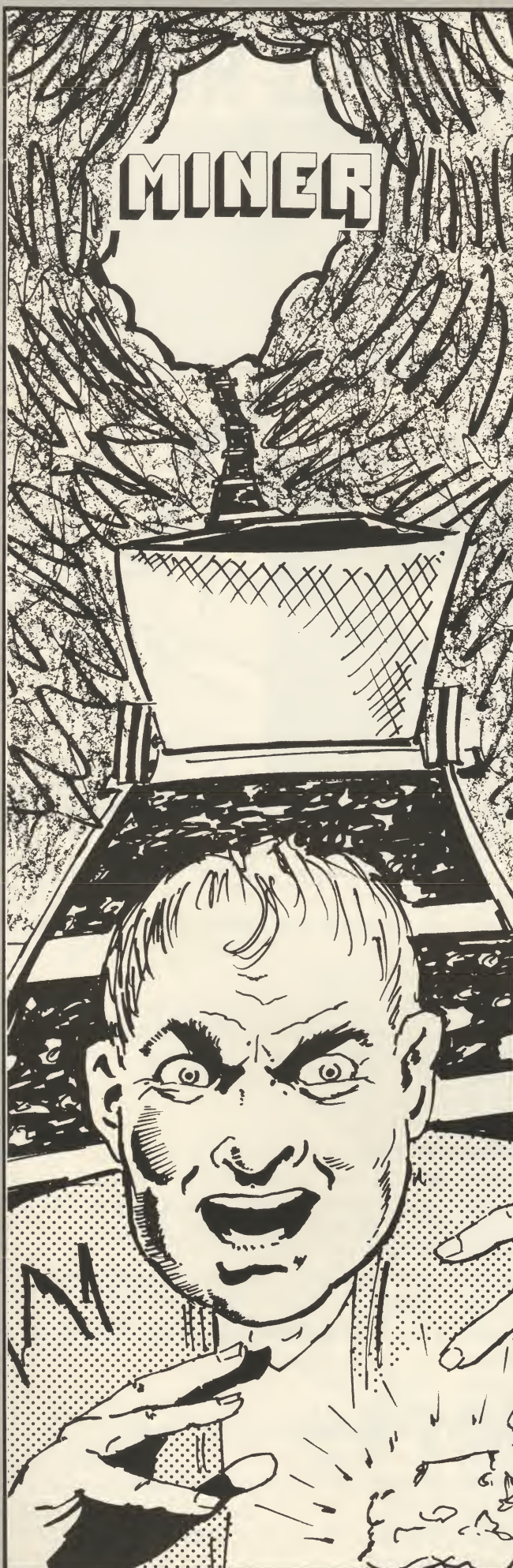
```

```

2000 PRINT INK 1;"
D O
D G E R ": PRINT "
@ 19
83 A.D.": PRINT : PRINT " The i
dea of the game is to avoid b
eing hit by the alien missile
s using the '5' and '8' keys. Af
ter every few waves of missile
s that you dodge your space-s
hip will descend one charact
er square until you reach the ali
en bases. You must keep away fr
om the stars at the edge of the
screen as they are mines. When yo
u have finished a game you wil
l get a rating.": PRINT : PRINT
TAB 6: INVERSE 1;"PRESS ANY KEY
TO BEGIN": PAUSE 0: RETURN

```





```

10 GOTO 40
20 LET S=S+C-(E*4)
30 GOTO 60
40 LET A=CODE "<92>"
50 LET S=CODE "COS "
60 LET E=PI-PI
70 LET C=E
80 PRINT AT 0,0,"CREDIT $";S;"
  "AT 1,0,"MINED $";C;"  ","DEP
TH ";E;"  "
90 IF S<0 THEN GOTO VAL "300"
100 IF E>20 THEN LET A=8
110 IF INKEY$="7" THEN GOTO 20
120 IF INKEY$="6" THEN GOTO VAL
"150"
130 IF INKEY$="S" THEN GOTO VAL
"400"
140 GOTO VAL "90"
150 LET E=E+PI/PI
160 IF INT (RND*CODE "=")>A THE
N GOTO VAL "200"
170 PRINT AT CODE "<95>";0,"GOL
"
180 LET C=C+INT (RND*CODE "<95>
")+CODE "<95>"
190 GOTO 80
200 IF INT (RND*160/A)<>CODE "7
" THEN GOTO VAL "240"
210 PRINT AT CODE "<95>";0,"EXP
"
220 LET C=C-CODE "COS "
230 GOTO 80
240 IF INT (RND*10)<>5 THEN GOT
O VAL "160"
250 PRINT AT CODE "<95>";0,"COA
"
260 LET C=C+INT (RND*5)+1
270 GOTO 80
300 PRINT "BANKRUPT"
310 STOP
400 IF E<>0 THEN GOTO VAL "90"
410 PRINT "PROFIT=$";S-200

```

YOU START with \$200 in the bank and your aim is to make as much profit as possible from your mine. It costs you \$4 to dig one metre and each time you return to the surface your funds are altered to take account of your profit and expenditure.

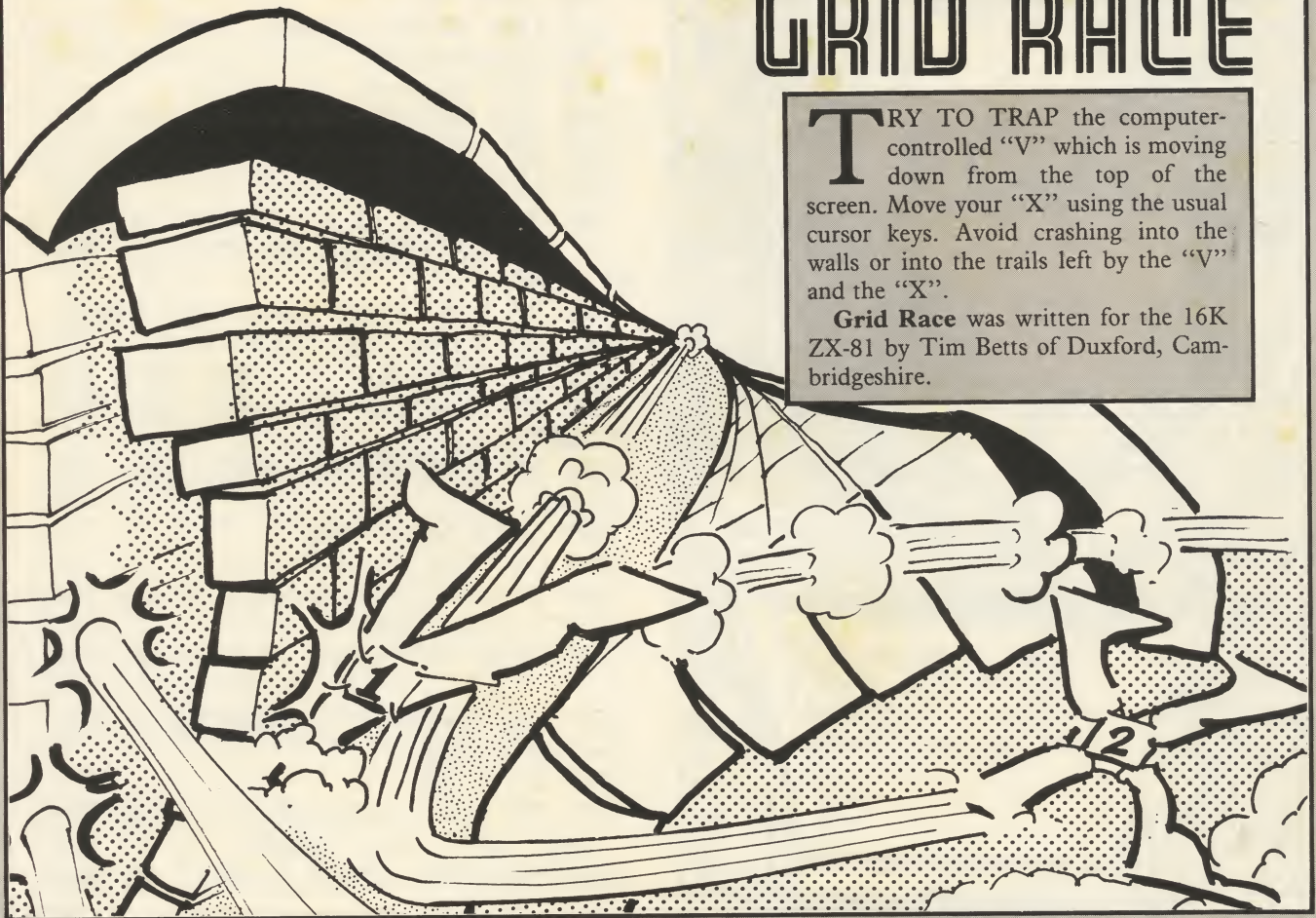
You may find coal (coa) or gold (gol), or you may be unlucky and be involved in an explosion, which will cost you \$200. Key 6 moves you down the mine and key 7 returns you to the surface.

Mark Evans of Welling, Kent wrote **Miner** for the 1K ZX-81.

GRID RACE

TRY TO TRAP the computer-controlled "V" which is moving down from the top of the screen. Move your "X" using the usual cursor keys. Avoid crashing into the walls or into the trails left by the "V" and the "X".

Grid Race was written for the 16K ZX-81 by Tim Betts of Duxford, Cambridgeshire.



```

1 REM "GRID RACE"
10 PRINT "(32*isp)"
20 FOR A=1 TO 20
30 PRINT "(isp:30*i+:isp)"
40 NEXT A
50 PRINT "(32*isp)"
60 LET X=19
65 LET DIR=3
70 LET Y=15
80 LET A=2
90 LET B=INT ((RND*20)+5)
91 LET C=A
92 LET D=B
93 LET YD=1
100 PRINT AT X,Y;"X"
101 LET A=C
102 LET B=D
110 PRINT AT A,B;"V"
118 PRINT AT A,B;" "
119 PRINT AT X,Y;" "
120 IF INKEY$="7" THEN LET YD=1
130 IF INKEY$="6" THEN LET YD=3
140 IF INKEY$="5" THEN LET YD=4
150 IF INKEY$="8" THEN LET YD=2
151 IF YD=1 THEN LET X=X-1
152 IF YD=3 THEN LET X=X+1
153 IF YD=4 THEN LET Y=Y-1
154 IF YD=2 THEN LET Y=Y+1

```

```

159 PRINT AT X,Y)
160 LET Z=PEEK (PEEK 16398+256*
PEEK 16399)
170 IF Z=128 OR Z=0 THEN GOTO 9
000
180 GOTO 2990
190 GOTO 100
2000 LET DIR=INT ((RND*4)+1)
2001 LET C=A
2002 LET D=B
2010 GOTO 3000
2990 LET L=0
3000 IF DIR=1 THEN LET C=C-1
3010 IF DIR=2 THEN LET D=D+1
3020 IF DIR=3 THEN LET C=C+1
3030 IF DIR=4 THEN LET D=D-1
3035 PRINT AT C,D)
3040 LET Z=PEEK (PEEK 16398+256*
PEEK 16399)
3050 IF Z=0 OR Z=128 THEN GOTO 3
070
3060 GOTO 190
3070 LET L=L+1
3075 IF L=5 THEN GOTO 3090
3080 GOTO 2000
3090 PRINT AT 1,1;"YOU WIN"
3100 STOP
9000 PRINT AT 1,1;"YOU LOOSE"

```


Arcade Action For The ZX Spectrum

SPECTRAVISION
JOYSTICK
£9.95

(arcade action,
pistol grip,
ATARI
Compatible)



Protek
JOYSTICK
INTERFACE
£14.95

If you want Arcade quality control for your Sinclair ZX Spectrum, you'll find the Protek combination hard to beat. The Interface is compatible with some of the best Arcade games from top software publishers including:

Flight Simulation by Psion

Slippery Sid by Silversoft

Spectrapede by Protek

Plus many more.

The Protek Joystick Interface is simple to use. It just plugs in at the back of your Spectrum and is compatible with any "Atari type" Joystick Connector. We recommend the Spectravision Joystick at only £9.95 for a Pistol Grip Joystick with a top and base fire button plus specially contoured shape and rubber suction cup footing for single hand operation.

Both units are available separately from

TRADE
ENQUIRIES
WELCOME

Subject to availability. Prices correct
at time of going to press.

=Protek=

COMPUTING LTD.

"Reg. Trade Mark"

Clydesdale Bank Building
High Street, South Queensferry
Edinburgh EH30 9HW
Tel. 031-331 4400

Available at larger branches of
John Menzies
and all good computer stores

LOTHLORIEN

WARMASTERS

Choose your weapons!

Spectrum 48K

(£5.50 each)

JOHNNY REB

WARLORD

REDWEED

PRIVATEER

(only £4.50)

Spectrum 16K

(£5.50 each)

ROMAN EMPIRE

TYRANT OF

ATHENS

SAMURAI

WARRIOR

ZX-81 16K

(£4.50 each)

ROMAN EMPIRE

TYRANT OF

ATHENS

PELOPONNESIAN

WAR

PRIVATEER

WARLORD

SAMURAI

WARRIOR



(PROGRAMMERS:— contact us first with your wargames software).

AVAILABLE FROM BETTER SOFTWARE SHOPS OR DIRECT BY MAILORDER
ACCESS NUMBER, CHEQUES OR POSTAL ORDERS PLEASE, PAYABLE TO:

M. C. LOTHLORIEN

DEPT S8, 4 GRANBY ROAD,
CHEADLE HULME, CHESHIRE, SK8 6LS

BUSINESS USERS

SPECTRUM 48K

ACCOUNTS PREPARATION

Produces Prime Entry Listings, Nominal Ledger, Trial Balance, Profit and Loss Account and Balance Sheet with supporting schedules. 73 nominal ledger accounts and automatic VAT calculations.

Sole Trader/Partnership (Up to 4)

£25.00

Limited Company

£25.00

(Combined Price £35.00)

SALES AND PURCHASE LEDGERS

Produces day book, sales/purchases and VAT analyses, debtors/creditors listings and statements. 250 accounts and 1000 monthly transactions. Automatically calculates VAT.

£25.00

ZX-81 16K

ACCOUNTS PREPARATION

31 nominal ledger accounts

Sole Trader

£17.50

Limited Company

£17.50

(Combined Price £25.00)

SALES AND PURCHASE LEDGERS

Produces day book, sales/purchase and VAT analyses, debtors/creditors listings, statements.

50 accounts and 200 monthly transactions.

Sales

£20.00

Purchases

£20.00

(Combined Price £25.00)

All programs have been professionally developed and are being used by practising accountants and small businesses. Supplied on cassette with operating instructions.

Full details:

HESTACREST LIMITED

P.O. Box 19, Leighton Buzzard, Beds. LU7 0DG
Tel. 052-523 785.

NEW: Speech & Music for ZX81 & Spectrum!

ZXM SOUND BOX

ZXS SPEECH SYNTHESISER

£29.95



£32.50

- 3 channel sound chip gives a huge range of possible sound effects. Programmable pitch, level, envelope and noise source.
- For the ZX81 or Spectrum - no adaptor needed.
- Just plug it in. Other peripherals or Ram Pack can be plugged into the ZXM.
- Built in amplifier and loudspeaker.
- Audio in/out socket, can be used to amplify the Spectrum 'beep'.
- 9-pin I/O socket can be used with cheap Atari/Commodore type joysticks.
- Comprehensive manual includes many example routines.

- For the ZX81 or Spectrum - no adaptor needed.
- Let your computer talk back!
- 'Allophone' synthesis gives an unlimited vocabulary.
- Active filtering for improved speech quality.
- Other peripherals or RAM Pack can be plugged into the ZXS.
- Output to normal audio amplifier or to our ZXM Sound Box.
- Manual gives full details on how to use the ZXS, with many examples.

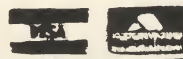
And Don't Forget Our Books;

EXPLORING SPECTRUM BASIC: £4.95 The book of answers. Explains Spectrum BASIC programming techniques in more depth than was possible in the Sinclair manual, illustrated by over 50 full programs. 192 pages.
THE EXPLORERS GUIDE TO THE ZX81: £4.95 The book for the ZX81 enthusiast. Games, application and utility programs plus much useful information on machine code and hardware. "Immediate and lasting value" (PCW).

All prices include U.K. carriage and VAT where applicable. Overseas customers add £1.50 per item for surface mail.

TIMEDATA Ltd. 16 Hemmells, Laindon, Basildon, Essex. SS15 6ED Tel.: (0268) 418121

timedata



SOUND with SINCLAIR

MAKE AMAZING SOUND EFFECTS
WITH YOUR ZX 81,
TIMEX Sinclair 1000
or SPECTRUM



THE ZON X

£25.95

incl p&p & VAT

* The ZON X SOUND UNIT is completely self-contained and especially designed for use with the ZX81, TIMEX Sinclair 1000 and Spectrum Computers. It just plugs in — no dismantling or soldering.

* No power pack, batteries, leads or other extras. *

* Manual Volume Control on panel — ample volume from built-in loud-speaker.

* Standard Sinclair — 16K Rampack or printer can be plugged into ZON X Sound Unit without affecting normal computer operation.

* Huge range of possible sounds for Games, Music, Helicopters, Sci-Fi, Space Invaders, Explosions, Gun shots, Drums, Planes, Lasers, Organs, Bells, Tunes, Chords, etc., or whatever you devise!

* 8 full octaves. Uses 3-Channel sound chip giving programme control of pitch, volume of tones and noise, all with envelope control.

* Easily added to existing games or programmes using a few simple "BASIC" lines or machine code.

* No memory addresses used — I.O. mapped.

FULL instructions with many examples of how to obtain effects and the programmes, supplied. Fully guaranteed. British Made.

*Except with Spectrum you need the Spectrum Extension Board Order No. SE1 — Price £6.80 incl. V.A.T.

Payment may be made by Cheque. PO Giro No. 388 7006.
Postal Order or Credit Card.
Export orders: — Bank Cheque. International Money Order.
U.S. \$ or £ Sterling.

BI-PAK

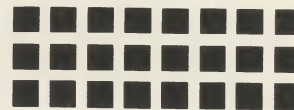
Dept. SU8, PO Box 6
63A High Street,
Ware, Herts.



Access & VISA accepted
Ring 0920 3182 for
immediate despatch.

**ZX81 +
ZX SPECTRUM +
SOFTWARE BOOKS.**

also BBC Micro



Cambridge Computer Store

1 Emmanuel Street
Cambridge CB1 1NE

Telephone (0223) 358264/65334
(closed 12.30 — 1.15 except Saturday)

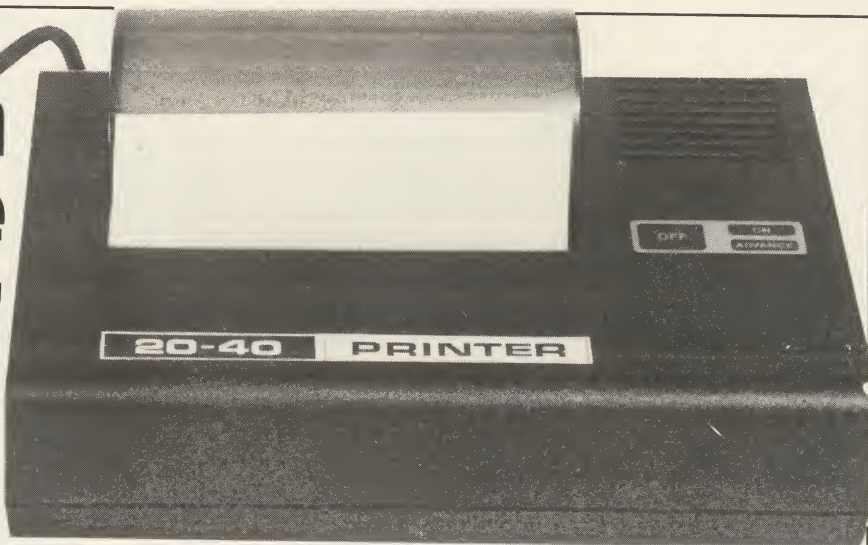
Spectrum compatible printer

- ★ Obeys standard Spectrum commands.
- ★ Printing speed 120 lines per minute maximum.
- ★ Low cost paper supply.
- ★ Price includes power supply and interfacing.

This thermal printer, now available in the U.K., is the standard printer used with the American version of the ZX81. The printer plugs direct into the Spectrum but has a through port allowing the use of additional hardware through the same connector.

The size of the printer is 7¼ x 5¼ x 3½ ins. attractively packaged in a moulded matt black plastic case.

A separate power pack is supplied in a 2½ x 3½ x 2¼ ins. case.



Two switches mounted on the printer allow for on/off switching and also access to the test mode and paper advance commands. The printing speed in the self test mode is 120 lines per minute.

The paper rolls are 4¼ ins. wide and 25 metres in length.

£99.95 Price includes - Printer, power supply, full interfacing, one roll of paper, VAT and p&p.

DEAN ELECTRONICS LIMITED
Glendale Park Fernbank Road Ascot Berkshire England
Telephone Winkfield Row (0344) 885661 Telex 849242

DEALER ENQUIRIES INVITED.

Please send me boxes of Paper (10 rolls per box) at £12 per box (incl. VAT, p & p).
Total £
Printer(s) at £99.95 each.
Cheque/PO made payable to: Dean Electronics Ltd.
Delivery 14 days allow 28 days max.



The Choice is Yours!



But do you really know which printer is best for your application?

As with the Computer market it's a difficult job these days knowing which printer is most suitable for your particular needs. Whichever manufacturer you turn to they tell you their's is ideal for the job.

Well, we at Hilderbay have been in computing for over 20 years. 20 years in which time we've gained an awful lot of experience. Experience we are happy to share with you — we are willing to evaluate your circumstances and advise on the best printer for the job at keen prices. We will make sure the printer you buy will be the best for your needs. So at the end of the day you won't be wasting money on facilities you won't use, nor will you have a printer which, though cheap, won't do what you need it to.

We also have a range of software for the Apple — i.e. Payroll £60, Bookkeeper £49, SSP £70 etc + VAT.

Another First from Hilderbay . . . Word Processor Systems for ZX Spectrum

At last — sensible, functional systems that give your Spectrum a word processor facility.

System 1 A package that utilizes the Spectrum and an Olivetti daisywheel typewriter to give you a stand-alone word processor. The typewriter doubles as printer and keyboard but can be used as a typewriter while still connected to the Spectrum — expected availability Mid-July.

System 2 A package that can be 'tailor made' to suit your needs, comprises a parallel interface, customised Tasword Two software and printer (from our wide range). This system can be supplied for any computer however, we do recommend a typewriter style keyboard for fast professional use with Spectrum. Spectrum Software: Payroll, Stock Control, SSP etc. Price on application.

JUST ARRIVED

Ideal for our System 2 package — a fast daisywheel printer that gives 20 CPS, 10, 12, 15 CPI and proportional spacing! Including a 1 year guarantee for only £399. VAT & delivery extra.

ALSO AVAILABLE

For Spectrum — Centronics type parallel interface including cable and connectors. Recognises LLIST and LPRINT. Does screen copy. Complete with driving software. Only £39.13 + VAT — please contact us about availability. Simple word processor for Spectrum free on request with printer or interface orders!

PLEASE CONTACT US FOR FURTHER INFORMATION



Hilderbay

Professional Software

Hilderbay Ltd Dept. SU8 8-10 Parkway
Regents Park London NW1 7AA
Telephone: 01-485 1059 Telex: 22870

EAT, DRINK and be HEALTHY

ALTO-TECH Software makes this easy with their new range of programs for the Sinclair ZX Spectrum (48K only). *Designed with YOU in mind.*

CALCOUNT: A simple guide to calorie intake. Eat yourself slim — in moderation of course! A complete meal capability with a calorie alarm. Allows you to "Tailor" the meal to your own requirements.

READOUT: CALORIES ONLY

CALFIFAT: Slightly more sophisticated, this program offers the same facilities as Calcount, but in addition, gives you fibre and fat content. Ideal for those on an F. Plan Diet.

READOUT: CALORIES, FIBRE and FAT

NUTRITION: For the serious food student, or the vitamin conscious. All the features of the Calcount program, *plus* comprehensive information on meal vitamins and other constituents.

READOUT: CALORIES, FIBRE, FAT, CARBOHYDRATES, PROTEIN, VITAMINS A, B1, B2, B6, B12, C and E.

MINCOUNT: Complementary to Nutrition, this program gives you details of your meal nutrients and minerals. The programs, used together, help you maintain a balanced nutritional intake, so essential to health and fitness.

READOUT: CHOLESTEROL, BIOTIN, FOLIC ACID, NIACIN, PANTOTHENIC ACID, SODIUM, PHOSPHOROUS, POTASSIUM, CALCIUM, IRON, MAGNESIUM, MANGANESE, SELENIUM, ZINC and COPPER

SHORTLY AVAILABLE FOR BBC AND DRAGON COMPUTERS

AS NATIONALLY ADVERTISED (TRADE ENQUIRIES WELCOME)

Tick box for Program required All prices include V.A.T., p & p

☐ CALCOUNT £4 95 ☐ CALFIFAT £5 50 ☐ NUTRITION £7 50 ☐ MINCOUNT £7 50

Name

Address

Postcode

Cheques, Postal Orders payable to:—

ALTO-TECH SOFTWARE

38, Nightingale Avenue, Hathern,
Loughborough, Leics. LE12 5JE
Telephone: (0509) 843765 (24 hr Ansaphone)

BRIDGE MASTER

Bridge is more than just a card game. It is a compulsive hobby and a means of making friends wherever you go.

For the beginner the problem is how to learn the game. Where do you find a good teacher? Where do you find the patient partners you need while you learn?

Bridgemaster overcomes these problems. You bid and play the hands in exactly the same manner as you would at the card table. The computer supplies your partners and Terence Reese, a world expert, coaches you through all stages of the game.

The package contains commentary tapes, computer tapes and a useful reference book — everything you need to learn bridge.

For the Sinclair ZX Spectrum 16/48K — £24.95. For the ZX81 16K — £19.95, ZX81 1K — £19.95*

Available from Boots, W.H. Smith and other leading computer stores or direct from
Bridgemaster, Dept. S1, FREEPOST,
PO Box 163, Slough SL2 3YY.

*Prices include VAT, post and packing. Cheques & PO's should be made payable to Bridgemaster.

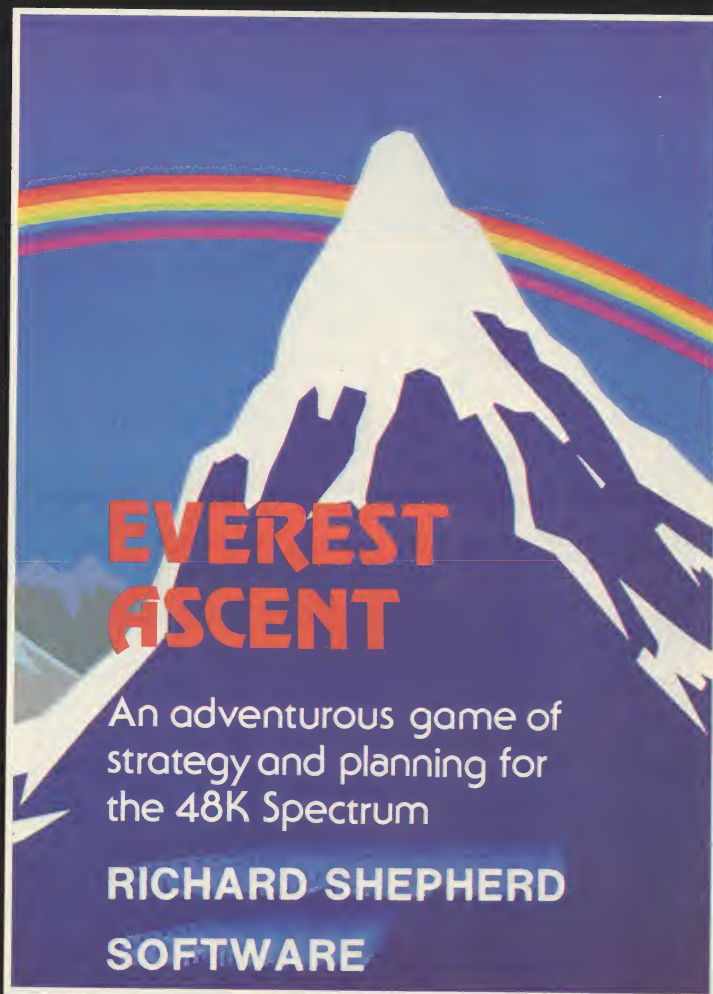
NOW AVAILABLE FROM W. H. SMITH & SON AND JOHN MENZIES



TRANSYLVANIAN TOWER

A spectacular 3-D maze
adventure for the
48K Spectrum

**RICHARD SHEPHERD
SOFTWARE**



EVEREST ASCENT

An adventurous game of
strategy and planning for
the 48K Spectrum

**RICHARD SHEPHERD
SOFTWARE**

TRANSYLVANIAN TOWER

A spine chilling adventure ... enter via the dungeons ... navigate your way through 500 3-D rooms ... survive the swooping vampire bats ... reach the terrifying top ... and rid the world of the evil Count Kreepie!

Can you survive the top of The Tower?

Full save routine for use during the hours of darkness!

48K Spectrum. £6.50.

Also available by mail order

SHIP OF THE LINE

Command, a sailing ship ... juggle your supplies, crew and firepower ... fearlessly battle your way up the admiralty ladder, bribe Sea Lords as necessary ... until you make First Sea Lord! Full save routine. 48K Spectrum. £6.50.



EVEREST ASCENT

Conquer the world's highest peak in defiance of all the obstacles, men and nature can throw at you ... survive avalanches ... cross bottomless crevasses ... cope with wayward Sherpas — but don't run out of supplies!

Full save routine. 48K Spectrum. £6.50.

Also available by mail order

SUPER SPY

A global spy chase through complex puzzles, coded messages and 3-D mazes. Follow Dr. Death's trail ... locate his secret island ... discover the entrance to his lair ... but it doesn't end there! A different solution every game. Full save routine. 48K Spectrum. £6.50.

**RICHARD SHEPHERD
SOFTWARE**

Dealers Generous discounts available

Credit Card Hotline 0628 21107

All programs are sold subject to the condition that they may not, by way of trade or otherwise, be lent, hired out, resold or otherwise circulated without the written permission of Richard Shepherd

DISCOUNT: BUY TWO GET £1 OFF
BUY THREE GET £2 OFF
BUY FOUR GET £3 OFF

ALL PRICES INCLUDE
VAT & FIRST CLASS UK POSTAGE
OVERSEAS ORDERS ADD £1.50 FOR AIR MAIL

48K EVEREST ASCENT	at £6.50	£
48K TRANSYLVANIAN TOWER	at £6.50	£
48K SUPER SPY	at £6.50	£
48K SHIP OF THE LINE	at £6.50	£
DEALER PACK	—	—
DISCOUNT	—	—
TOTAL	£	£

a) I enclose cash/cheque/P.O. payable to Richard Shepherd Software
b) Debit my ACCESS/VISA Card No.

with the sum of £ Signature

NAME ADDRESS

SEND IMMEDIATELY TO: RICHARD SHEPHERD SOFTWARE
FREEPOST (no stamp needed), MAIDENHEAD, BERKS, SL6 5BY

TELESOUND 84

(Patent Pending)



SPECTRUM BEEP BOOSTER

... Puts Sound Through TV ...

Probably the world's smallest sound modulator, measuring $2\frac{1}{2} \times 1\frac{1}{2} \times 1$ cm, TELESOUND 84 fits inside the ZX Spectrum and most other home computers to enable the BEEP to be heard directly from an unmodified TV. Sound can be controlled by the TV from a whisper to a roar. Fitting takes only minutes with three easy snap-on connections, eliminating soldering. Dealer enquiries welcome.

TELESOUND 84 costs £9.95 inclusive from

COMPUSOUND
32 Langley Close, Redditch
Worcs B98 0ET

University Software

LIBRARY OF ADVANCED MATH/STAT/ECON

TAPE 1: MATRIX OPERATIONS

SPECTRUM £6.95, ZX81 £5.95

Side A: Inversion, multiplication, addition, subtraction and scalar multiplication of matrices and vectors within one single program. Any output can in turn be used as the input of the next operation without re-typing. Capacity: 16K ZX81: 25×25 , 16K Spectrum: 17×17 , 48K Spectrum: 48×48 .
Side B: Determinants of square matrices.

TAPE 2: POLYNOMIALS

SPECTRUM £6.95, ZX81 £5.95

Side A: Includes quadratic equations (as degree 2 polynomials) and Newton-Raphson and half-interval search methods for higher degree polynomials. Computes the roots with 8 digits of precision.
Side B: You can plot polynomials in any interval and examine their roots, extremum points.

TAPE 3: INTEGRATION

SPECTRUM £6.95, ZX81 £5.95

Side A: Integration of functions by Simpson's and trapezoidal rules. Also computes the area enclosed by two functions.
Side B: Plot of integrals. Integration can be visualised on the screen.

TAPE 4: REGRESSION

SPECTRUM £7.95, ZX81 £6.95

Side A: A highly developed multivariate regression program featuring Log/Ln option on each variable (thus allowing exponential and geometric regressions), R^2 , corrected R^2 , standard errors, t-statistics, F-statistics, degrees of freedom, Durbin-Watson statistic, interpolation. Capacity (no of variables $\times$ no of observations): 16K ZX81: 2×500 , 5×250 , 10×140 , 16K Spectrum: 2×220 , 5×100 , 10×50 , 48K Spectrum: 2×1800 , 5×900 , 10×500 .
Side B: Plot of bivariate regressions. You can see how your computer draws a best-fitting line on a set of numbered data points.

TAPE 5(a): LINEAR PROGRAMMING

SPECTRUM £7.95, ZX81 £6.95

Side A: A user friendly optimisation program capable of handling all sorts of linear programming problems (any combination of $<$, $=$, $>$, constraints and $x_i > 0$, $-x_i < 0$, $-x_i < \alpha$ sign constraints). Features the canonical equivalent of the primal, values of slack variables and the dual. Capacity (no of variables $\times$ no of constraints): 16K ZX81: 10×23 , 15×20 , 20×15 , 16K Spectrum: 10×10 , 48K Spectrum: 10×50 , 25×40 , 50×30 .
Side B: Solutions of simultaneous equations.

TAPE 5(b): PROFESSIONAL LINEAR PROGRAMMING

£14.95

Available for 16K ZX81 and 48K Spectrum with above features plus 'save-data' and 'change-data' facilities. Any single data entry can be changed without re-typing the whole data.

● Cheques payable to:
UNIVERSITY SOFTWARE
29 St Peter's Street
London N1 8J9

● All incl. prices for the UK.

● Tapes 1 - 5(a) Spectrum £35
ZX81 £30

DON'T MISS THIS INCREDIBLE OFFER!

50 GAMES £9.95!

CASSETTE 50 FOR YOUR MICRO



GALACTIC ATTACK
SPACE MISSION
LUNAR LANDER
PLASMA BOLT
STARTREK
RADAR LANDING
ATTACKER
GALACTIC DOGFIGHT
ZION ATTACK
IVASIVE ACTION
OXO
BOGGLES
PONTOON
SKI JUMP
HANGMAN
OLD BONES
THIN ICE

MAZE EATER
ORBITTER
MOTORWAY
FORCE FIELD
NIM
TUNNEL ESCAPE
BARREL JUMP
CANNONBALL BATTLE
OVERTAKE
SITTING TARGET
SMASH THE WINDOWS
SPACE SHIP
JET FLIGHT
PHASER
INTRUDER
INFERNO
GHOSTS

SUBMARINES
ROCKET LAUNCH
PLANETS
BLACK HOLE
DYNAMITE
DO YOUR SUMS
DERBY DASH
SPACE SEARCH
UNIVERSE
RATS
TANKER
PARACHUTE
JETMOBILE
HIGH RISE
THE FORCE
EXCHANGE



CASCADE SOFTWARE

NOW AVAILABLE FOR

Sinclair VIC-20

SPECTRUM

ZX81

LYNX

DRAGON

ATARI

apple (ON DISC & CASSETTE)

ORIC-1

BBC A/B

We Buy Games/Contact Now



DIRECT MAIL ORDER FORM

CASCADE SOFTWARE

CASCADES HOUSE
BARGAN'S LANE
LLANDOGO
GWENT
S.WALES NP54PA



SUPPLY CASSETTE 50 FOR

COMPUTER

I enclose cheque/P.O.

Signature of Parent/Guardian

Name

Address

SU8

UPGRADE YOUR SPECTRUM to 48k

with an EASY TO FIT DELTA-RAM KIT

SPECTRUM

1 ☐ £33

SPECTRUM

2 ☐ £26

Each kit contains step by step instructions for easy, trouble-free installation within your Spectrum case. Prices include p. & p. and V.A.T.

FREE with every order the UNIQUE DELTA CHIPCHEK Memory Diagnostic Cassette worth £3.50

All you need to do is cut out this coupon, tick the appropriate box, enclose your cheque or Access No. and we'll do the rest.

Name
Address

Postcode

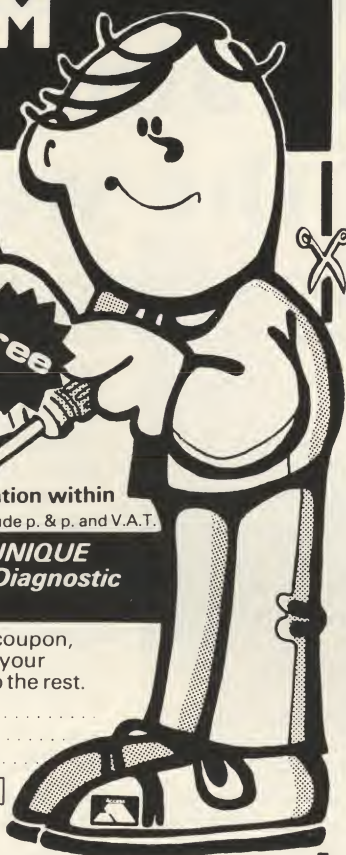
Access Number

Make cheques payable to Servodata Ltd.



DELTA RESEARCH LIMITED
15 Church Street, Basingstoke, Hants RG21 1QG

Tel: 0635 45373



HIGH SPEED MACHINE CODED GAMES FOR THE ZX SPECTRUM

We now have a selection of new and original games. Because this advert has to be written well in advance, we cannot give more details here. Why not write to us for a full sheet, which will give full details of all our products.

COMPILER

We still market our highly successful compiler for the ZX Spectrum (either memory size). This will compile 99% of all integral, non-string Spectrum BASIC. It converts your slow BASIC program into a high speed version in machine code (up to several hundred times faster). No knowledge of machine code is needed. As well as handling normal basic, our compiler boasts a range of commands designed especially for writing games, these include mini sprite graphics (hi-res plotting of characters) and an explosion noise generator. All of this for £7.99 which includes an instruction booklet and both 16K and 48K versions. A recent review in *Personal Computer World* stated "It would certainly be a good investment for the Spectrum owner, who wants some of the benefits of machine code without having to learn its idiosyncrasies".

Part of a reply from a satisfied customer "I have just received your Spectrum compiler and I must congratulate you, it is an excellent program.

Make PO/Cheque payable to:

Wye Valley Software, Parton House, Kinnersley, Herefordshire. Overseas orders please add £1.50.



THE WIZARD'S WARRIORS: A fast moving game that matches developments in your skill as a player by becoming increasingly more devious. By offering to you the full range of options you can choose how to control your warrior through the maze. A full implementation of this program enables such features as a continuous series of sound effects, arcade quality graphics, double-point scoring, and-for the very artful-bonus lives

Spectrum £4.95

FORTH: A full implementation. Ideal for writing fast moving arcade type games. Allows the full colour and sound facilities of the Spectrum to be used. Future Microdrive enhancements will be made available.

Spectrum £14.95

ADVENTURE ONE: Features a save game routine as the game can take months to complete.

ZX81 £5.95

'A remarkably good version . . . well worth the money.' ...*Sinclair User*...

MAZEMAN: A fast action m/c game that reproduces the spirit of the original '...is very accurate and fast.' ...*Which Micro?*...

Spectrum £4.95

ZX81 £4.45

ZX81 £5.95

CHESSE 1.4: Ten levels of play with this m/c program.

Good graphic screen display.

'In a class of it's own.' ...*Your Computer*...

INVADERS: Very fast m/c action. Includes mystery ship and increasingly difficult screens.

ZX81 £4.45

7 MAES AFALLEN, BOW ST., DYFED, SY24 5BA

24hr Ansaphone 0970 828851



Taking the strain out of calculating the wages

Starting with the ZX-80 Ronald Sims has always found serious uses for his machines. Claudia Cooke talks to him about how they help.

NO-ONE was more pleased than Vera Sims when her husband Ronald invested in his first computer, a ZX-80. For the first time in almost 20 years, her workload was reduced from a day-and-a-half each week to only four hours. Mrs Sims has the job of calculating and paying the weekly wages for the 35 employees of the family automation business.

"I used to do it all in my head, with the help of a ready reckoner and it took me a day and a half. Now my husband has written a program which does it all for me and it takes a few hours. It has been marvellous".

Her husband has since changed to a ZX-81 with a 64K Memopack and the program covers job costing for up to 10 jobs, tax deductions, a variety of individual allowances and more than 30 subtotals and totals.

Mrs Sims, 69, says: "It was a bit strange at first because I didn't know the first thing about computers but I

soon got the hang of it and now I'm really pretty quick".

Husband Ronald, 70, interrupts to reveal that the early days were not that simple. "She just wouldn't believe it at first. When the computer produced the figures she used to take them down

'The computer just cannot make the kind of human errors everyone makes'

quickly and work it out herself to make sure. I must say her calculations were as quick as those of the computer.

"Now she realises that the computer just cannot make the kind of human errors which every person is bound to make at some time or another".

Although the Sinclair is his first computer, Sims is no newcomer to the processes of logic involved. He had

worked in the radio industry since 1929 and had become fascinated by 'wirelesses' even before he left school at the age of 17.

"At school we had a physics master who was very keen on the wireless, as it was known in those days. I was charged with his enthusiasm and by the time I left I was one of few people who knew how they worked."

His first job was with a firm selling do-it-yourself wireless kits. People would buy the kits on Friday, he says, and return on Monday to find what they were doing wrong. His job was to advise customers exactly how to assemble them.

"In the early 1930s I realised my technical education was not keeping pace with the changes so I got a job with Siemens in telephone exchange development work. The logic then was the same as the logic of computers today and I was given a good training".

When the second world war broke



out, the company had just begun work on the development of radar and Sims became chief of test gear.

"There was such urgency because of the war that we had to start manufacturing in quantity products which had not been made previously. Being responsible for testing, it was the first time I really became interested in automation and automatic testing."

After the war, Sims left to join Michael Sobell, first as technical assistant to the buyer and then as chief buyer. He stayed with the company for 12 years and says that without Sobell's commercial guidance he could never have started his own business.

Start it he did, 25 years ago, when he detected a gap in the industry for automation. Today his company, Lectromec Controls, is still flourishing in south London, run by his three grown-up sons and his ZX-81.

He is working on a cashflow program for the firm, although he is doubtful whether his Memopack can cope with a sufficient number of invoices.

His wages program took many months to compile but the result has been worthwhile. Not only does it do the job much faster, it rules out the necessity for Mrs Sims to have her cash sheets checked by someone else before handing-out the pay.

"If you make a mistake you just look at the picture and know if it's right or wrong", says Mrs Sims. "The only thing is that you lose your brain, because you just look at the picture and copy it all down. I used to have to make so many calculations in my head but now I almost think you could become brainless within a few years."

Sims has one criticism of Sinclair, levelled at the printer. "I think it was very ambitious to produce this printer but I think it leaves a lot to be desired. It prints so badly; I think it's the thermal paper. If you leave it switched on

Christmas. We couldn't drag them away from the set. We all enjoyed it".

The eldest grandson, aged 12, has already had the ZX-80 bequeathed to him, together with the 16K memory.



He is at least as enthusiastic as his grandfather.

Now Sims is working on a conversation program to use with his grandsons at this year's Christmas gathering. It is a marvellous program so far, tailored individually to each of the four boys so that if one gives the computer his name, it is liable to answer back with the name of his brother.

A selection of 10 answers to each response from the boys appears at random, resulting in some highly-enterprising *non sequiturs*, as well as some startlingly accurate replies.

When asked how I was feeling by the computer, I replied "very hot", only to be told rather cheekily: "You look all right to me". When I agreed with the computer's suggestion, "I hear they call you Podge", it replied curtly. "Stop mucking me about".

Sims hopes to develop the program to around 10 or 15 minutes by Christmas and is gaining evident enjoyment from

and play the organ. He is from a musical family and as a child learned to play a variety of instruments, including the piano, violin, flute and piccolo, but his favourite remains the organ. "I particularly love playing classical music. I have always found it relaxing. To return home and get lost in the music for a time is a wonderful way of recovering from work".

The Sims also have a narrow boat, moored on the Thames, to which they retreat whenever possible during the summer months to enjoy the sun and the fresh air.

"Mostly we take it on the Thames these days, rather than the canals, but it is a wonderful way of relaxing. You don't have to arrange it all in advance; you just decide to go and that's it. It's a kind of freedom which is very valuable in business because, contrary to popular opinion, you cannot just take-off on holiday overseas whenever it suits you. You never know what will happen until the last moment".

Both are now semi-retired and the father figure wisely attempts to keep his nose out of the family business to a great extent, leaving his sons to run it the way they wish to do.

"I never pushed them into it, or expected too much of them. They all worked for other firms for a few years before joining me but I must admit it is pleasant that they all wanted to join. Now one is the managing director, one is sales director and the third is really installation manager".

One of his sons has also become a highly-proficient organist, playing in a dance band. His father pours generous praise on his talent.

Married for 43 years, the Sims are a contented couple, although not content to sit back and do nothing. Theirs is an active life, made more so by the advent in their home of the computer.

They certainly defy any theory that computers are for the young. It was Mrs Sims who, having read *Sinclair User*, became the first person to nominate someone for the title of User of the Month — her husband.

She nominated him not only for his wages program but also for the fact that he derives so much enjoyment and relaxation from compiling the programs. His enjoyment of making the programs, she says, is almost greater than his enjoyment of operating them in his computer and although she steers clear of programming, she has learned a new skill at an age when few women expect to do so.

'I think it was very ambitious to produce the printer but it leaves a lot to be desired; it prints so badly. If you leave it switched on all day the thing gets warm and the print blurs.'

all day, which we might need to do often, the whole thing gets warm and the print blurs".

On the whole, though, he sees his computer as a great boon and not only for work purposes. "We have four grandsons and you should have seen them with all those computer games at

the work involved.

Aside from the computer, he and his wife are kept busy at their home in Ewell, Surrey. Mrs Sims is a regular bowls player, although sadly out of action during my visit due to a back injury. Her husband likes nothing better than to sit down for an hour or so

SPECTRUM AND ZX81 HARDWARE



The famous Panda Expandable Ram Pack. Massive 16K add-on memory which can easily be expanded to 32K with an optional plug-in module. Supplied in rugged no-wobble design, rugged, injection moulded case, contoured to fit the ZX81 snugly.

Compatible with other add-ons (printer etc). LED on/off indicator. No additional power needed just plug in an go. British designed and made from top quality components throughout, guaranteed 12 months. **£19.95**

EXPANSION MODULE

The 16K 'Panda' is easily expanded from 16K to 32K by adding this expansion module as and when you need it.

£14.50



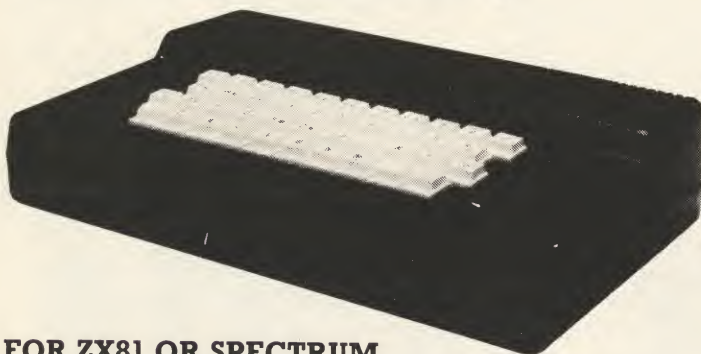
GIANT PANDA

Giant Panda the two together. Buy the Panda and the Expansion Module at the same time for a gigantic 32K bytes and save.

Complete at a special price of

£34.00

PROFESSIONAL CASED KEYBOARD TYPE FD42



FOR ZX81 OR SPECTRUM

This famous, best selling product immediately converts your ZX Computer into a sturdy, attractive and professional unit, with full size typewriter keyboard. A tough plastic case encloses the keyboard, PCB and power supply. It has 42 keys including all the ZX81/Spectrum graphic characters printed on them. The full travel key switches have gold plated contacts and guaranteed life of 10⁶ operations. It's so easy to install! You simply unscrew the ZX PCB from its case, screw it to the FD case, and plug in the keyboard. No soldering. Access to user port is unobstructed for memory upgrade etc. Full instructions supplied.

£29.95

Fitting service

£4.00

RAM Adaptor Board—enables you to fit 16K Expansion (all types) inside Fuller-case—

£9.75

TYPE FDS FOR ZX81 OR SPECTRUM

Our new advanced keyboard has the same, fine specifications as the FD42 system, but with a new re-designed case, space bar and double-sized shift and enter keys. A must for the discerning ZX81 or Spectrum user.

£39.95

ZX KLIK—KEYBOARD

If, like many ZX81 users, you are fed up with the dead feel of the touch sensitive keypad then consider the well tried 'Klik-Keyboard'.

This is a simply fitted genuine push button keyboard which has been designed as an exact replacement for, and is no larger than, the existing keypad. ■ Fits on to the ZX81. ■ Full 40 keys plus one spare for any purpose. ■ No soldering—just plug in. ■ No trailing wires. ■ Clear permanent two colour legends. ■ Positive feel and sound as data is entered. ■ Speeds up programming enormously and reduces errors.

■ Fitting service offered £2.00 extra (remember to send your ZX81).

£24.50



SPECTRUM JOYSTICK

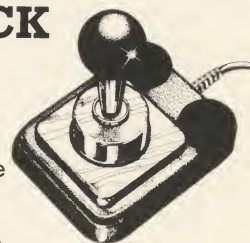
NOW AVAILABLE FROM AFDEC

Outstanding Features

- Self centring stick.
- Super strong nylon and steel construction, built to last.
- A total of 8 directions plus 2 large fire buttons.
- Arcade proven moulded leaf switches ensure incredible reliability.

For ZX Spectrum Complete with self contained box interface which simply plugs into the Spectrum expansion port (with or without printer)

£25.00



THE SOUND EXPANDER

A superb economical addition to your ZX Spectrum. Clear, dynamic sound effects will really enhance your enjoyment of the new exciting programs available for the Spectrum. Our new sound amplifier comes with lead, pre-setable volume and built-in loudspeaker. Simply plug into the mic input, it fits neatly behind the Spectrum.

£7.50

STOP PRESS!

REDUCED due to volume sales

16K Spectrum owners—upgrade to 48K with a Spectrum Upgrade Pack complete with full instructions.

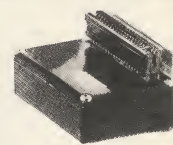
No Soldering.
Issue II and III.

£26.00

The lowest cost 16K RAM pack known to us!

- Boxed ■ Tested ■ Guaranteed
- Thousands in use.

£18.50



Please supply (state which computer you have).
Quantity Item Amount

Quantity	Item	Amount

Round-the-clock telephone orders 0256 52208

I wish to pay by

Access/Barclaycard/Visa/Diners Club

Please debit my creditcard a/c

NUMBER

Signed

.....

All prices include VAT and post and packaging. All items include a full year guarantee. Products are stocked and usually despatched within 10 days. Overseas customers add £4 post and packing. Cheques/Postal Orders etc. should be made payable to AFDEC Electronics Ltd.

Name

Address

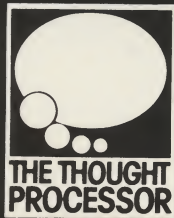
.....

.....

EXPORT ORDERS WELCOME PLEASE ADD £4.00 P&P.

AFDEC
ELECTRONICS LTD

318 Kempshott Lane Basingstoke Hants RG22 5LT



MiCROL[®]

**THE NAME
ON THE
WORLD'S
FINEST
SOFTWARE**

What the experts say:

Sinclair User... "QUALITY"

• **USE AND LEARN**

Sinclair User... "EXCELLENT VALUE"

What Micro... "TREMENDOUSLY VALUABLE...
GET THE BEST OUT OF SPECTRUM BASIC"

ZX Computing... "EXCELLENT... A GREAT
ASSET... FANTASTIC VALUE... VERY HIGHLY
RECOMMENDED"

• **THE DATABASE**

Sinclair User... "EXCELLENT VALUE"

MicroDecision... "OF ALL THE DATABASE-TYPE
PROGRAMS AVAILABLE, MICROL'S SEEMS
THE BEST VALUE... MORE FOR YOUR MONEY"

• **THE SPREADSHEET**

Personal Computer News... "EASY
TO USE... PLENTY OF USES... STREETS AHEAD"
(OF GEMINI'S SPREADSHEET)

Sinclair User... "EXCELLENT VALUE... MUCH
CLEARER" (THAN VU-CALC)

What Micro... "QUALITY"

BBC & SPECTRUM SPREADSHEETS
Now with 45 Page "Spreadsheets
Course" Manual + 4 FREE Ready-
to-use Models

THE DATABASE & THE SPREADSHEET
Now Available With Special Features, for
BBC 32K. Please phone or write for
Information & Prices.

MICROL®

**Order TODAY for fast
convenient delivery**



MiCROL[®]

SERIOUS SPECTRUM SOFTWARE only £9.95 each!

USE AND LEARN

Your perfect Spectrum starter Kit. 25 original BASIC programs you can use immediately, PLUS 118 page manual to help you get the most from your 16or48K Spectrum.

25 programs include: Music Composer, World Atlas, Computer Term Glossary, Screen Designer, Star Maps – PLUS games and powerful routines to use in your own programs: graph-drawing, text-editing, sorting, searching and much more. 118 page manual includes detailed description of programming techniques, full listings of all programs, and articles to develop your own program-writing skills.

"Excellent" A.R. West, Surrey. "First-time loading, user-friendly, superb documentation" J.E. Mann, Leeds.

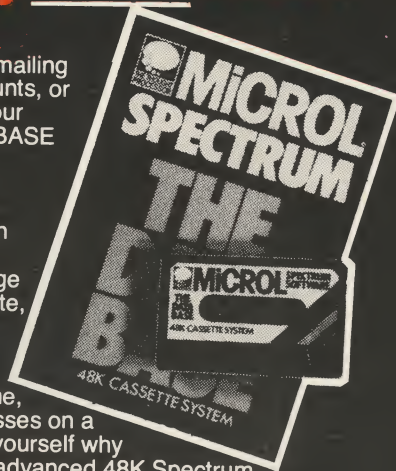


THE DATABASE

Whether you want to update mailing lists, manage customer accounts, or simply produce an index of your record collection, THE DATABASE makes it easy and enjoyable.

A breakthrough in power and practicality, THE DATABASE allows you to store information on any subject in the way you want, and gives you a full range of commands to display, update, sort, search and print – even perform calculations.

Massive storage capacity: 1,000 lines in memory at a time, over 7,000 names and addresses on a single C90 cassette. See for yourself why THE DATABASE is the most advanced 48K Spectrum database available – far more powerful and practical than Sinclair's VU-FILE and all other "competitors".



THE SPREADSHEET

Based closely on Visicalc, the world's best-selling program, THE SPREADSHEET turns your 48K Spectrum into a "super-Calculator" that helps you solve all kinds of number-based problems quickly and easily. Hundreds of applications in business, engineering and science – and just as versatile for home finance management. Invaluable in education too, helping develop maths ability and confidence. In power, flexibility and ease of use, THE SPREADSHEET outperforms all other Spectrum spreadsheets – including Sinclair's VU-CALC. See for yourself, with the security of MiCROL'S 14 day money-back Guarantee.



THE WORD PROCESSOR

The only full feature, professionally-written word processor for 48K Spectrums. Use it to produce memos, letters, reports

– THE WORD PROCESSOR has the features you need, including flexible editing, justification, centering, and automatic "word wrap". Simplicity itself to use, THE WORD PROCESSOR uses the same "what you see is what you get" principle as word processors costing hundreds of pounds more. 30,000 character storage capability for real-work applications, and it's easily adapted to work with full size printers. Once again, MiCROL sets the standard in serious Spectrum software.



To order: (UK Orders Only).
Simply complete the coupon,
and FREEPOST with your cheque,
made payable to MiCROL (UK Mail Order).
All products normally available from
stock and despatched by return.
Credit Card Orders: By phone 9-5.30
Mon to Fri. stating name and address,
Card No. and item(s) required.

MiCROL[®]

38 Burleigh Street, Cambridge CB1 1BR.

(0223)312453

Post to:- MiCROL (UK Mail Order) Freepost
38 Burleigh Street, Cambridge CB1 1BR

SU8

Please send me.....copy/copies of USE AND LEARN

Please send me.....copy/copies of THE DATABASE

Please send me.....copy/copies of THE SPREADSHEET

Please send me.....copy/copies of THE WORD PROCESSOR

I enclose cheque/P.O. for..... (£9.95 + 50p p+p – £10.45 total each)

Or I wish to pay by Access/Barclaycard/Visa

Card Number

Please print name and address

Name

Address

Credit Card

holder's signature

The Galaxy's FIRST ever computer comic!

Zooming into touchdown at WH Smiths, John Menzies and other good newsagents now
and every fortnight... only 40p.

Order your copy TODAY!

Bursting with great new comic strips... exciting stories... astounding facts...
big prizes... competitions... fascinating quizzes... star personalities.
And that's just the start of Britain's newest, brightest, most fun-packed comic ever!

LOAD RUNNER

It's the only comic for the age of the computer -
it puts the rest back with the dinosaurs!



**Only
40p**

AVAILABLE NOW

and every fortnight... order your copy **TODAY.**



QUEST **FOR ANY SPECTRUM**

SIMPLY THE BEST

THE BLACK HOLE

THE SCENE: Alien spacecraft are using hyperspace drive to enter our universe through a black hole. Their intent is destruction.

YOUR MISSION: To uphold the defence of your universe as long as possible while inflicting the maximum damage on alien forces.

YOUR WEAPONS: Positive and Negative Ion Guns are deadly at any range but the ion stream is bent by the massive gravitational field of the black hole. The Neutron Blaster is equally deadly but has only limited range.

YOUR BATTLE: You are under constant attack from the alien force which pits fiendish offence craft against you in ever increasing intensity, in deadlier and deadlier form.

How long can your fleet of ships survive? How many enemy craft can you destroy? 100% super efficient machine code allows all this action to be packed in to run on the 16K (or 48K) Spectrum. Superb animation, high resolution graphics, incredible explosive and full sound effects combine to make "Black Hole" set a new standard in Spectrum software.

Also features a special learning mode to help develop your skills.

Embedded in the software is our unique score validator which enables us to introduce a new dimension to computer games. The top ten scorers in each calendar month from April through September will receive a "I'm a Black Hole addict" T-shirt and the chance to compete for prizes to the value of £500 in a championship to be held at the end of the year. We will then publish a list of the top 1000 scorers so you can find out just how good you are.

HOW GOOD ARE YOU? Take up the "BLACK HOLE" challenge NOW and find out. Send £5.50 to QUEST, 119 THE PROMENADE, CHELTENHAM, GLOS GL50 1NW to receive your copy of "BLACK HOLE" by return first class post together with a membership number entitling you to discount on our forthcoming blockbusting software.

**Trade enquiries welcome
excellent terms available**

**A NEW DIMENSION
IN SPECTRUM SOFTWARE**

Nick Goldman and Jerry Seabridge show how to merge programs without much difficulty

Two into one will now go on the ZX-81

ONE PROBLEM until now with the ZX-81 has been that when a program is loaded from tape any previous program in the computer is NEWed and lost. That means that two programs, each saved separately on tape, could not be merged into one program. That would clearly be useful for, say, writing subroutines which could be written and tested separately and then merged with a main program on a different tape. The merge feature has been included on the Spectrum and the routine we developed means that now two programs can quickly be combined into one, with few restrictions on the programs so merged, on the ZX-81.

The procedure used is outlined and explanations of the important steps are given. The basic theory is to reserve space in the 16K memory by putting RAMTOP, the address of the first byte, above the Basic system area, to a value below the normal 16K value of 32768, and then transferring the first program,

byte by byte, into the reserved space.

The second program is then entered, along with a routine which will retrieve the first program, add it to the second program, and correct the values of line lengths — the third and fourth bytes in each program line, see page 171 of the ZX-81 manual — and so on, so that the program will not crash or behave abnormally. Here is the procedure:

First, the user's first program is entered from cassette tape. Restrictions on the program are that the line numbers must all be lower than 9899 but greater than the greatest line number of the user's second program, yet to be loaded. That is so that when the two programs are merged eventually, the line numbers will be in the correct order and the computer will not crash. To this program must then be added the final line: `XXXX REM END`

where XXXX is the line number, which must be big enough to make it the last line of the first program but must still

be less than 99. When the program is entered, the following direct commands must be entered, in the correct order:

```
LET X = PEEK 16396 + 256*PEEK 16397 - 1
```

```
LET Y = 49230 - X
```

```
PRINT Y
```

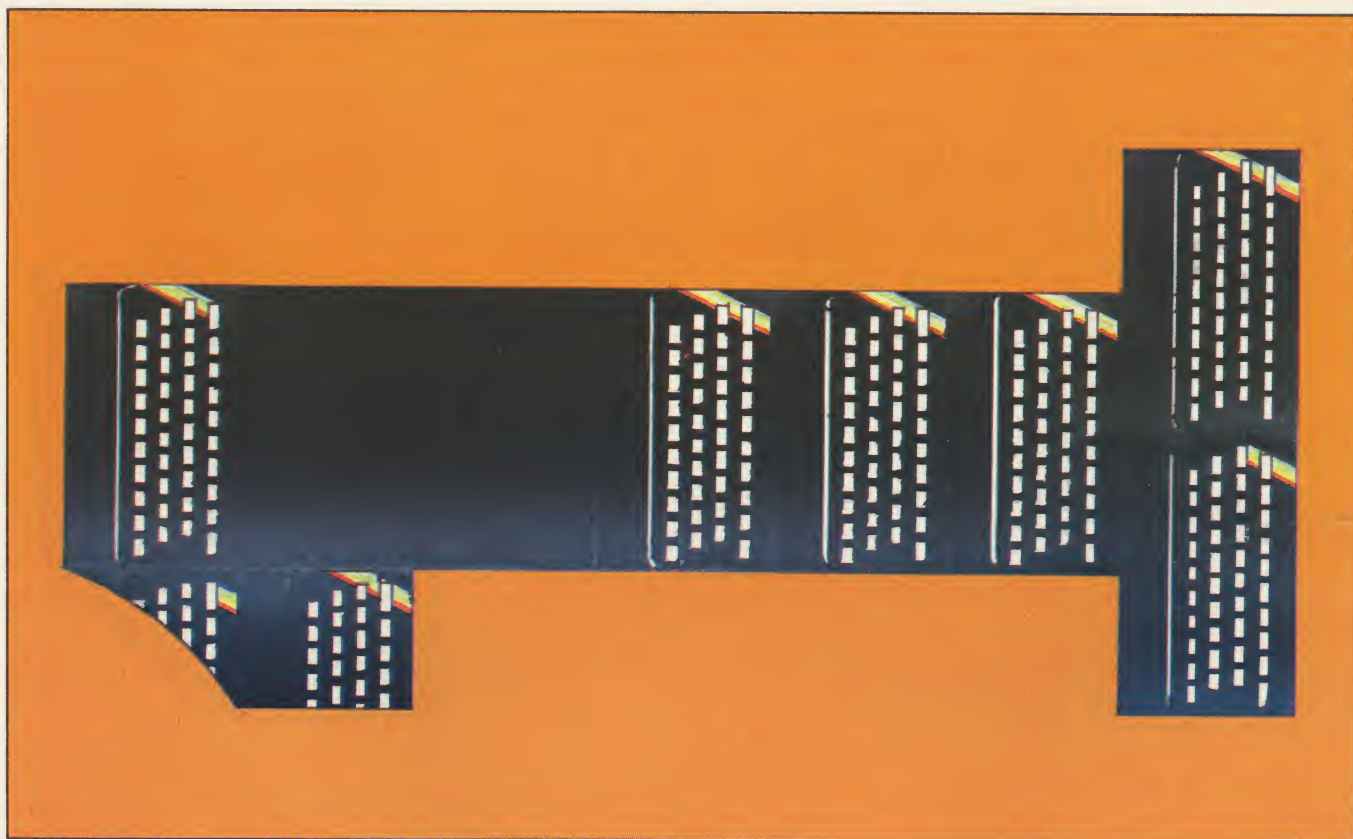
and the value of Y should be written or remembered. Then:

```
POKE 16388, Y - 256*INT(Y/256)
```

```
POKE 16389, INT(Y/256).
```

X, the value of D FILE — see chapter 27 of the ZX-81 manual — minus one, is the last byte of the program and is thus the last byte which must be transferred. Y is the location where the first byte of the program will be stored — 49230 was chosen as it leaves a little spare room before the end of the computer's 16K; and RAMTOP is poked to that value — the two POKE commands — so that when NEW is executed the transferred bytes will not be erased. That can be verified by typing:

```
PRINT PEEK 16388 + 256*PEEK
```



16389 which should give the value of Y which was written.

Next the routine given in listing one, lines 9900 to 9920, is added to the first program. Then type:
GOTO 9900 followed by:

NEW as soon as the computer has finished the loop starting in line 9900.

That routine copies the bytes of the first program into the memory, starting at the location given by the variable Y. NEW is executed to clear everything except those stored bytes. To verify that the first program is still stored above RAMTOP, type:

PRINT PEEK (your value of Y)*256 + PEEK (your value of Y + 1).

That should return with the first line

correct number of REM statements can be produced quickly.

As soon as the REM lines have been typed-in, the command GOTO 1 should be entered. The routine — lines 1 to 13 — will then transfer the first program back from above RAMTOP back to the main program, and when the report code 9/13 — STOP executed in line 13 — is seen, the final. The merged program can be tidied by deleting lines 1 to 13 and any left-over REM lines after line 9900 may also be removed.

This is how the final 13-line routine works:

The first two lines POKE RAMTOP to its usual (16K) value of 32768. That is so that as the routine progresses, the space where the first lines were stored

appropriate location. That means that the line

XXXX REM END

will finally become:

XXXX REM END (+ left-over Xs from the REM line)

e.g., XXXX REM END
XXXXXXXXXXXXXXXXXXXX

and the appearance of this is an indication that the merging is successful. Of course, if the final REM line had exactly the correct number of Xs, the line will remain

XXXX REM END

Using this routine we believe that any two Basic programs can be merged into one. Of course, that does not extend the limit of 16K imposed by having only a 16K RAM pack and it should be noted that any variables stored will be lost as the procedure is followed.

A large number of direct commands have been used where they could have been included in the two routines we have given — listing one and two — since if the procedure is to be worthwhile it should be as short as possible.

For long programs it is obviously superior to run the two routines in FAST mode but that is not very informative if for any reason the computer should crash. Therefore until you are confident that you have the procedure correct, we suggest that you take the extra time to run the routines in SLOW mode and keep an eye on the computer, even if that takes a long time.

'Until you are confident that you have the procedure correct we suggest that you take the extra time to run the routines in slow mode and keep an eye on the computer'

number of your first program.

The next stage is to load your second program from tape. The program should have all of its line numbers greater than 13 but smaller than the smallest line number in the first program, so that, again, the eventual lines when merged will be in the correct order.

Once that is done the routine given in listing two — lines 1 to 13 only — should be typed-in, and then the following direct commands:

LET Y = (your previous value of Y)
LET K = PEEK 16396 + 256*PEEK 16397

and after those, REM statements must be typed-in, as lines 9900 and 9901 in listing two. Each REM statement should include 100 Xs and there should be 10 such REM statements for each 1K of the first program which has already been copied above RAMTOP.

After one REM statement has been typed-in, the other can be duplicated quickly by using the EDIT facility and adding 1 to the line number each time the line is copied. In that manner the

can be over-written once those lines have been re-transferred, and that enables longer programs to be merged.

Lines 3 to 4 check for the location of the REM command in the line:

XXXX REM END

at the end of the first program, that being the marker used to indicate the end of the first program, and the loop passes to line 5 with the variable F being the location of this REM command.

The variable K which was defined previously by direct command is the location of the first byte in the first REM line — line 9900 — and is the location into which the first byte of the first program is POKEd. The REM statements are used to reserve space below the Display File — we spent some time trying to POKE the system variable D FILE but with no success — and the first program is simply POKE into the locations occupied by the REM lines. Thus lines 5 to 8 POKE the first program into the space reserved by the REM lines, except for the CHR\$ 118 which indicates the last character in the line:

XXXX REM END

Lines 7 and 9 are to clear the space which was occupied by the first program.

Finally, lines 10 and 11 count the extra Xs left over from the last REM line POKEd into and line 12 POKEs the new length of the last line into the

Listing 2.

```
1 POKE 16388,0
2 POKE 16389,128
3 FOR F=Y TO 99999
4 IF PEEK F < > 234 OR PEEK (F+1) < > 42 OR PEEK (F+2) < > 51 OR PEEK (F+3) < > 41 OR PEEK (F+4) < > 118 THEN
5 NEXT F
6 FOR G=Y TO F+3
7 POKE G,0
8 NEXT G
9 POKE G,0
10 FOR G=F+K-Y+4 TO 99999
11 IF PEEK G < > 118 THEN NEXT G
12 POKE F+K-Y-2, PEEK (F+K-Y-2)
13 STOP
9900 REM XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
X
9901 REM (100 Xs)
```

10 lines per 1K stored program

Listing 1.

```
9900 FOR F=16509 TO X
9910 POKE Y-16509+F,PEEK F
9920 NEXT F
```


ORWIN SOFTWARE: ZX81 CASSETTES

THE BEST SOFTWARE (BY VARIOUS AUTHORS) AT LOW PRICES

"Michael Orwin has built a reputation for value-for-money software and his Cassette 4 offers quantity as well as quality."

Sinclair User, October '82

"If each game was on a separate tape and selling for £5 each I would still recommend them. But all on one for £5...! This sort of value for money just has not been seen before on any personal computer."

"Without sounding pushy I would like to conclude this review by saying — if you have a ZX-81 and like games, then you should buy Michael Orwin's cassette 4."

2 extracts from *ZX Computing*, Oct/Nov '82

"Eight games, including an excellent version of the Scramble arcade game... Easy to operate, graphically impressive and good value for money."

The Times, Saturday 11th December 1982 (about Cassette 4)

CASSETTE 1 (eleven 1k programs)

£3.80

Machine code:

React, invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.

Basic:

I Ching, Codebreak, Robots, Basic Hangman. PLUS Large screen versions of Invaders and Maze of Death, ready for when you get 16k

CASSETTE 2

£5

Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Wordbreak, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.

CASSETTE 3 8 programs for 16k ZX81 STARSHIP TROJAN

£5



Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens

and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photon torpedo tracking.

PRINCESS OF KRAAL An adventure game.

BATTLE Strategy game for 1 to 4 players.

KALABRIASZ World's silliest card game, full of pointless complicated rules.

CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.

SECRET MESSAGES This message coding program is very txip qexi jf.

MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.

CASSETTE 4 8 games for 16k ZX81 £6

ZX-SCRAMBLE (machine code) with 3 stages.

Bomb and shoot your way through the fortified caves.



GUNFIGHT
(machine code)

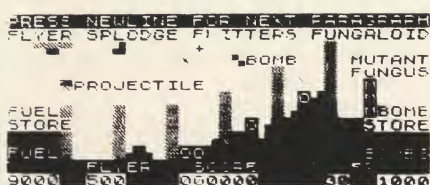


INVADERS
(machine code)



FUNGAL TIDE

THE FUNGALIDS ARE GROWING AND WHEN THEY REACH THE SKY THEY PRODUCE DEADLY SPORES. YOU CONTROL A FLYER AND YOUR MISSION IS TO DESTROY THE FUNGALIDS BY TRAPPING ANTI-FUNGUS BOMBS ON THEM.



GALAXY INVADERS (machine code)

Fleets of swooping and diving alien craft to fight off.

SNAKEBITE (machine code)

Eat the snake before it eats you. Variable speed. (very fast at top speed).

LIFE (machine code)

A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)

Played on a 4x4x4 board, this is a game for the brain. It is very hard to beat the computer at it.

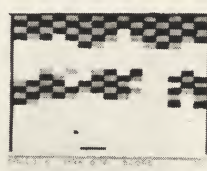
7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).

CASSETTE 5 8 games for 16k ZX81 £6

BYTE-MAN (machine code)
(previously available from Mindseye)



BREAKOUT (machine code)



SPACE RESCUE (machine code)
(previously available from Mindseye)



BLITZ (machine code)



PLANETOIDS (machine code)

Rotate, move, fire and hyperspace controls. Wide range of choice of speed and difficulty.

DODGEMS (machine code)

Dodge the computer's car while eating the dots.

DRAUGHTS (machine code)

Three skill levels.

MERCHANT (Basic)

Make your fortune on trading voyages in the Mediterranean and beyond.

7 of the 8 games are in machine code because it is much faster than Basic.

Please make cheques payable to **ORWIN SOFTWARE**.
ORWIN SOFTWARE, Dept. OSU, 26 Brownlow Road, Willesden, London NW10 9QL.
ZX81 & SPECTRUM SOFTWARE WANTED

The best accessory for your micro



ONLY
£34.49
(P+P £2.50)

The Rotronics Portable Case

Here is the ideal portable work station for home, school or work. Specially made for most home microcomputers, it contains your ZX81, Spectrum, Oric or VIC 20 within a smart executive style case with removable lid for convenience in use.

The individually tailored foam insert securely protects your

micro, printer, cassette recorder, tapes and manuals during transit. A scalpel is provided to modify the insert for expansion units and an alternative insert can be supplied if you change your hardware in the future.

All components remain fully operational within the case via inter-connections routed between the

double layers of foam, so there are no unsightly leads.

This is the first case designed for easy use with each component positioned for convenient operation. The overall dimensions are 138mm x 657mm x 363mm.

Exceptional Value

ZX Panda

16K Expandable RAM Pack
£18.50 (p + p 50p)
16K Plug-in Module for above
£13.95 (p + p 50p)
32K Giant Panda including Module
£31.45 (p + p 75p)



Vixen Ram Cartridge

Offers standard 16K expansion plus three other switchable memory configurations
£34.45 (p + p 50p)



Order Form

Trade Enquiries Welcome

Please send me (tick appropriate box)

- ☐ Rotronics Portable Case at £36.99 (inc. £2.50 p + p) for ZX-81/Spectrum/Oric/VIC 20*
- ☐ ZX Panda 16K RAM Pack at £19.00 (inc. 50p p + p)
- ☐ ZX Panda 16K Plug-in Module at £14.45 (inc. 50p p + p)
- ☐ ZX 32K Giant Panda including Module at £32.20 (inc. 75p p + p)
- ☐ Vixen RAM Cartridge at £34.95 (inc. 50p p + p)

All prices inclusive of VAT

I enclose a cheque/PO for £ _____ made payable to SMT.

*Please delete as necessary.

Name _____

Address _____

SMT

SU 8/83

Please allow 14 days for delivery. Send to (no stamp required)
FREEPOST Greens Norton Towcester Northants NN12 8BR



GRAND SLAM



NOW PLAY BRIDGE ON YOUR OWN
WITH
MICROBRIDGE

THE PERFECT TUTOR FOR IMPROVING BRIDGE PLAY.
PRAISED BY EXPERTS AS THE IDEAL COMPANION FOR
BEGINNERS AND ADVANCED PLAYERS.

 Microbridge allows you to play Contracts all the time, at your own pace, in your own way, against a formidable defence.

 Microbridge gives you an infinite variety of Contracts to practise your card play, in a way never before possible.

 Microbridge contains special features to help you analyse your play as it progresses.

 Microbridge does not get upset or lose its temper! It develops your confidence and skill in a remarkable way.






PLEASE SEND ME YOUR MICROBRIDGE CASSETTE FOR THE SPECTRUM 48K

NAME _____

ADDRESS _____

I ENCLOSE MY CHEQUE/P.O.
FOR **£7.99** PAYABLE TO
'STELLAR SOFTWARE'
144, PAMPISFORD RD, SOUTH
CROYDON, SURREY CR2 6DA



SPECTRUM 16 OR 48K

RUN RABBIT RUN

£4-95

inc. postage
SPECIAL OFFER
FREE
GAME TAPE
"CAT & MOUSE"
with every order




Eat the lettuces and carrots
before the farmers catch you.
Choice of speeds from slow
to Super Rabbit.

VIDEO
PRODUCTIONS

101 LABURNUM ROAD,
REDCAR, CLEVELAND, TS10 3PF.

I enclose cheque / P.O. made payable to Video
Name _____ Productions
Address _____

If you're a *serious* Sinclair user — why don't you stop playing games?



If you need a new challenge that doesn't involve saving the universe from destruction, beating off green monsters or flying a spaceship — we can bring you down to earth with stimulating, practical projects for the ZX81 and Spectrum in **Sinclair Projects** magazine!

In recent issues we have shown how to use your Sinclair for controlling your central heating . . . improving the graphics . . . build a printer interface . . . and many more ideas that tax your ability and ingenuity.

Sinclair Projects is published every two months as a glossy, instruction-packed magazine that gives you all the encouragement you need to exercise your talent and take a serious look at what your Sinclair can do for you.

Each issue can contain as many as FIVE step-by-step projects — yet it's yours for JUST 95p. So if you want a break from playing games, make sure you order YOUR **Sinclair Projects** from your newsagent today — or fill in the form below and we will send it direct to you, six times per year.

Mail to: ECC Publications Limited: 30-31 Islington Green, London N1 8BJ

Sinclair Projects (6 issues — price £9.90 including P&P) I enclose a cheque for £ _____

Please charge my credit card: Card name _____ Number _____

Name _____ Address _____ Date _____

Signature _____

NB This offer applies to UK subscribers only. Overseas rates available on request.

Creator 1

CHARACTER & ART GENERATOR

Facilities include;

UDG. CHARECTER GENERATOR.

Lines, columns, diagonals & individual pixels can be set or cleared.

90 degree rotation of UDG's.

Left/Right mirroring of UDG's.

Up/Down mirroring of UDG's.

Inverse of UDG's.

Copy one UDG to another.

Swap pairs of UDG's.

20 UDG's are displayed in a 4 X 5

array on the screen and updated as

each pixel is altered.

Colour of ink & paper may be chosen.

UDG'S may be saved to tape, stored in a dictionary. Which may also be saved.

ART GENERATOR.

Creative pictures may be drawn to the screen with details added by use of the CHARECTER GENERATOR.

the I-ching

The ancient Chinese art of telling

fortunes via the use of coins.

Dare you risk an answer to your queries

CREATOR 1.....£4.95

THE I-CHING.....£6.95

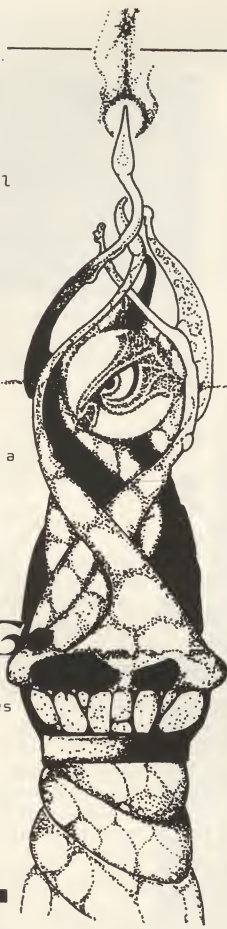
Make Cheques or Postal Orders payable to

SIRIUS LOGIC, 40, Byerley Road,

Fratton, Portsmouth. PO1 5AX.

(allow 14 days for delivery).

SIRIUS LOGIC



TRACE

★ For any ZX Spectrum ★

THIS PROGRAM WILL HELP YOU TO:

Debug your BASIC programs quickly and easily.

Understand how other BASIC programs work.

Follow complex BASIC programs step by step.

Teach BASIC quickly and easily.

HOW?

Before the SPECTRUM executes each BASIC statement in your program it will display the line/statement number and the statement itself in the input area (it will not overwrite the main display area). You control the speed from single step to very fast. You can produce a trace listing on the ZX printer, stop your program at any point to print variables or other expressions, and start/stop tracing from anywhere in your program.

THE PRICE?

Only **£6.95** INCLUDING P & P From:

TEXGATE COMPUTERS LTD.

Dept.S., 14 Brook Lane, Corfe Mullen, Dorset BH21 3RD

TASWORD TWO

THE WORD PROCESSOR

64 CHARACTERS PER LINE ON THE SCREEN AND TO PRINTERS!

TASWORD TWO The Word Processor

Your Spectrum becomes a **professional** word processor with TASWORD TWO. TASWORD TWO gives you an amazing **64 characters per line** on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen.

Tasword Two drives the following interfaces:

Cobra RS232 I/O Port

Euroelectronics Interface (ZX Lprint)

Hilderbay Interface

Kempston Interface

Morex Interface

The same program drives these interfaces. A short easy to follow set of instructions takes you through setting up your Tasword Two to drive the interface you have or choose to buy. Tasword Two does drive the ZX printer.

£13.90 fully inclusive mail order price.

TASWORD TWO £2 Demonstration Cassette

See for yourself the powerful features of TASWORD TWO. Send just £2 for the Tasword Two demonstration cassette. A voucher is included which gives you £1 off the price of TASWORD TWO.

TASMAN SOFTWARE

Dept SU

17 HARTLEY CRESCENT LEEDS LS6 2LL

48K
SPECTRUM

TASWORD The Word Processor

"This package is definitely value for money."

Educational Computing, April 1983

The first real word processor for the Spectrum and still great value for money. Thirty two characters per line make it ideal for use with the ZX printer.

£7.95 fully inclusive mail order price.

TASWORD £1 Demonstration Cassette

Send just £1 for the demonstration cassette and a voucher giving you 50p off the price of TASWORD.

ZX81 TASWORD

"Very good value and great fun to use."

"Unreservedly recommended." Popular Computing Weekly 19/8/82

No demonstration cassette available but send 50p (refundable against your subsequent purchase of ZX81 TASWORD) for a copy of the manual.

£6.50 fully inclusive mail order price.

TASWORD TUTOR

"an eloquent demonstration of Tasword's uses"

Every TASWORD program comes complete with a manual and a cassette. The cassette contains your TASWORD and TASWORD TUTOR. This teaches you word processing using TASWORD. Whether you have serious applications or simply want to learn about word processing TASWORD and TASWORD TUTOR make it easy and enjoyable.

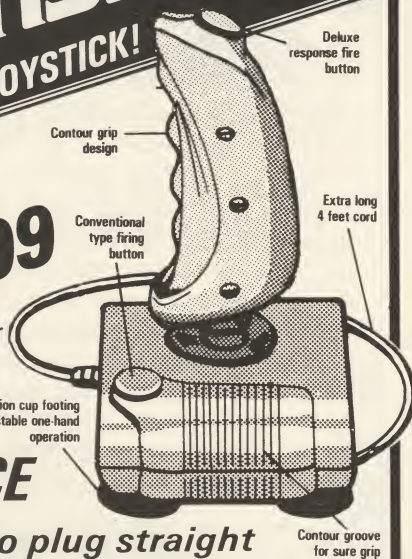
SPECTRUM Quickshot

THE ULTIMATE JOYSTICK!

ONLY
£19.99
+ £1.50 P&P

INCLUDING
INTERFACE

- Interfaced to plug straight into your Spectrum
- Full instructions
- 8-way movement
- Compatible with more software than ever!! including:



Please supply (tick items)		Amount
☐ Spectrum Joystick	@ £19.99	
☐ Vic 20 Joystick	@ £12.99	
☐ Atari 400/800 Joystick	@ £12.99	
Software		
☐ 3D Tunnel	@ £5.99	
☐ Galaxians (Artic)	@ £4.99	
☐ Spookyman (Abbex)	@ £4.99	
☐ Slippery Sid (Silversoft)	@ £5.99	
☐ Cyber Rats (Silversoft)	@ £5.99	
☐ SS Enterprise (Silversoft)	@ £5.99	
☐ Nite Flite (Hewson)	@ £5.99	
☐ Time Gate (Quicksilva)	@ £6.99	
☐ Meteoroids (Softek)	@ £4.99	
☐ Gulpman (Campbell)	@ £5.99	
☐ Cosmic Guerilla (Crystal)	@ 5.99	
☐ Jetpack (Ultimate)	@ £5.50	
☐ PSSST (Ultimate)	@ £5.50	
☐ Blind Alley (Sunshine)	@ £5.99	
☐ Mazeman (Abber)	@ £5.99	
☐ Cosmos (Abbex)	@ £4.99	
☐ Galaxians (Abbex)	@ £4.99	
☐ ETX (Abbex)	@ £4.99	
☐ Frenzy (Quicksilva)	@ £4.95	
☐ Astro Blaster (Quicksilva)	@ £4.95	
☐ Knot in 3D (Newgen)	@ £5.95	
☐ Joust (Softek)	@ £5.95	
☐ Frogger (DJL)	@ £5.95	
(Software Post Free)	Plus Postage	£1.50

ALLOW 7 DAYS

TRADE ENQUIRIES
WELCOME

24hr CREDIT CARD LINE

TOTAL
ENCLOSED



DATTEL ELECTRONICS
27 HOPE STREET, HANLEY,
STOKE-ON-TRENT
TEL: 0782 273815

TRANSFORM LTD. Business Software

FOR SMALL BUSINESSES AND THE SELFEMPLOYED

Business Bank Account.

This program enables you to make debits under 11-15 subheadings. Statements include totals of all subheadings.

ZX 81 £8.75 ZX SPECTRUM 48K £10.75

Sales Day Book.

For all your invoices, this program will enable you to prepare statements of outstanding invoices. Program will also calculate VAT.

ZX 81 £8.75 ZX SPECTRUM 48K £10.75

Purchase Day Book.

Keeps a complete record of all your purchases under 11-15 subheadings. This program will also calculate and deduct VAT.

ZX 81 £8.75 ZX SPECTRUM 48K £10.75

Business Packs.

Incl. Bank Account, Sales, Purchase & Quarterly Analysis programs.

ZX 81 £25.00 ZX SPECTRUM 48K £30.00

Stock Control.

Handles 900 lines, includes details of supplier. Program has full search facilities enabling you to search & update all lines from one supplier. It is also possible to deduct items from stock.

ZX SPECTRUM 48K £10.75

Invoicing.

This program will print out invoices, calculate discounts and VAT. The program will calculate totals from unit prices, giving the description of each unit price.

ZX 81 £15.00 ZX SPECTRUM 48K £15.00

Word processing By Tasman.

Tasword Two is a powerful word processing program that will perform all the functions available on a large word processor. The program will give you on screen 64 characters per line.

ZX SPECTRUM 48K £13.90

Masterfile By Campbell Systems.

This is one of the best data systems available for the ZX Spectrum. This program has many uses in a small business.

ZX SPECTRUM 48K £15.00

Payroll By Byte One.

This payroll program will handle upto 40 employees and will also calculate N.I.C., PAYE., superannuation and many other deductions. This is a very useful program and extremely good value.

ZX SPECTRUM 48K £19.95

All the above programs include VAT, post and packing.
A VAT invoice will be sent with all purchases.

Printers

All the above programs with the exception of Masterfile and Payroll, will now run on a full size printer. We can now offer you a complete package including interface and printer.

Interface for ZX 81 including cable by Memotech.....	£44.78
Interface for ZX SPECTRUM by Kempston.....	£39.14
Seikosha GP 100A printer.....	£191.00
Seikosha GP 250X printer.....	£228.00
Epson RX 80 printer.....	£261.50
Epson FX 80 printer.....	£381.60

Many other printers available send SAE for details on software and printers.

Please add VAT to the prices of printers and interfaces plus £5.00 for postage on printers.

TRANSFORM LTD.

41 Keats Ho Porchester Mead Beckenham Kent

Tel: 01-658 1661

Poor presentation handicaps teaching aids

John Gilbert reviews the latest releases.

THE EDUCATIONAL sector of the book market is expanding but the standard is not becoming noticeably higher. Although the psychology of teaching by computer seems to be developing in the proper direction, the standard of presentation in many cases is not good enough. The explanation is that the books on the market are either too difficult or too easy for the beginner to understand.

The *Spectrum Starter Packs*, numbers one and two, are for the 48K Spectrum. They suffer from being too easy for the age range at which they seem to have been aimed. The packs do not take into account that most children looking at them are growing up in an age of electronics. They do no more than illustrate points in the Spectrum manual and show how the various commands work on the computer.

Both starter packs contain program cassettes which explain how the computer works and provide examples of the Spectrum Basic commands. Most of the information on the cassettes is dealt with in the books accompanying the packs, so the inclusion of such cassettes is superfluous.

The books could be used in primary schools, although they would be of more value as a talking-point for teachers than an aid which is given to children who are then left to learn programming virtually on their own.

The intentions behind the starter packs seem good but a little more work could have gone into them to improve the presentation. *Spectrum Starter Packs*, one and two, cost £9.95.

Books on so-called good programming techniques are now forming an important sector of the market. Although most authors fail to inform their readers that there is no best way of programming, the standard of the books is good.

Databases for Fun and Profit, by Nigel Freestone, is one of the good programming books. The author aims to give the reader an understanding of data structures which are used in programming. The book is not machine-specific and should be easily understood by



most owners of the ZX-81 and Spectrum.

It starts by introducing the binary and hexadecimal number systems which are associated with computers, particularly with storage and machine code. It then explains how arrays can be used to create a variety of data structures, such as lists, trees and stacks.

When those structures have been explained the author shows how they are used in several types of programs. He shows what is needed to write diary and bank account programs and name and address systems. He also shows how to incorporate arithmetical formulae, such as income tax calculations, into a program to provide some way of processing the data once it is entered.

Databases for Fun and Profit contains much valuable information for anyone wanting to put Sinclair machines to good use. It is published by Granada Publishing and costs £5.95.

Turning from software projects we move to hardware with *Simple Interfacing Projects*, by Owen Bishop, also published by Granada.

Like the book on databases it is not machine-specific and that makes it different from all the rest. The projects include a real-time clock, a music generator and a ROM board. There are 12

projects which can be built and they are laid out in an easy-to-understand manner. A brief explanation is given of the project and how it works, then the construction details are discussed. As a result the book would be of interest to anyone who has a computer and a basic grounding in electronics. Some experience of programming would also be useful but not essential. *Simple Interfacing Projects* costs £6.95.

Another book which will be of interest to ZX-81 owners is *The Ins and Outs of the Timex TS-1000 and ZX-81*, by Don Thomasson. The book looks as if it was written for a readership in the States but it has some relevance in Britain. It explains the hardware of the ZX-81 and includes a complete circuit diagram of the machine.

The author explains how the CPU chip works and gives a detailed account of the pins which feed it with input and output data. A practical knowledge of electronics is necessary for you to follow the discussions in the book and a knowledge of machine code would also be helpful. It is published by Melbourne House and costs £5.95.

A new work from Interface is *The Turing Critereon — Machine Intelligent*

continued on page 96

continued from page 95

Programs for the 16K ZX-81. The introduction defines computer intelligence as communicating along a wire with something which you are not sure is human or machine.

The problem with the book is that you cannot tell whether it has been written by a human author or a machine, because it is full of listings and not much else.

The book professes to show machine intelligence in action, complete with explanations of how intelligent programs work. Far from doing so the authors have provided a group of listings with information on how to play the games.

The listings are impressive but some of them are lengthy and take hours to enter. It might be better to buy a tape with the listings recorded on it.

Another strange thing is that the book shows how to convert programs from the ZX-80 into ZX-81 programs. Apart from being irrelevant to the subject matter, the idea of typing ZX-80 programs into a ZX-81 seems futile. It costs £5.25.

It is good to see that most publishers are starting to reduce prices as they introduce new titles. All the titles in this

month's review cost less than £7. Last year books about Sinclair computers cost anything from £5 to £15.

Many publishers are having to lower prices because of the competition from companies which have just entered the market. As a result the standard should continue to rise and prices should fall.

The first book to deal with the insides of the Spectrum, *Spectrum Hardware Manual* by Adrian Dickens, must be a welcome addition to any construc-

'It describes its workings in detail and does not indulge in technical jargon.'

tor or student of computers, writes **Stephen Adams.**

It provides an insight on how the computer works and then describes the Spectrum in detail, including complete circuit diagrams of everything, except the ULA.

The user has to be satisfied with a pin-by-pin description of that device. The author describes its workings in simple detail and does not indulge in

technical jargon. The circuit principles are explained but not component by component, except where the author is sure of his ground, i.e., the power supply, CPU and RAM chips.

The video section is a little misleading as it refers to B-Y as BLUE-YELLOW, where in real life the Y stands for luminance — the whiteness of the picture. It gives the adjustments necessary to deal with some problems associated with the video.

One-third of the book is circuit diagrams and descriptions of circuits the user can add to the back of the Spectrum. The author seems a little nervous about suggesting that the user make improvements inside the Spectrum. A port made from a PIO, add-on joysticks, plus an exterior keyboard are also described. One suggestion for model one users only is to allow for 127 extra ports by improving on the decoding for the I/O map.

The differences between the models one and two are pointed-out frequently, with photographs to show the components on the circuit board. A "dead cockroach" IC and the transistor across the model two Z-80A CPU are described, along with why they were necessary.

Sherston Software

Sherston Software offer a range of educational programs designed by primary school teachers and written by professional programmers. It is our policy to produce high quality programs at reasonable prices.

Reading Programs

Short Vowel Sounds: BBC Model B and Spectrum 48K

A very comprehensive program to practice short vowel sounds using simple words and pictures. Options include diagnostic, practice and final assessment modes. The speed, number of retries and weighting on particular vowels can all be altered. Nicely presented with graphics and sound effects. **£7.00.**

Word Builder: BBC Model B

Word Builder builds up words exactly as children should and shows the sequence on the screen for the children to sound out and read at their own speed. Includes sections on initial consonants and short vowel sounds, consonant blends and digraphs, double consonants and vowel-consonant digraphs. Presented in large, colourful, lower case letters. **£4.00.**

Maths

Maths Snap: BBC Model B

A 'game' for 1, 2, 3 or 4 players to practice number bonds. Options include addition, subtraction (or both), multiplication and division (or both) all at five levels of difficulty. The time allowed and number of questions per game can both be altered making it suitable for all ability levels. Children love it! **£6.00.**

All programs have been thoroughly tested in the classroom and are accompanied by full explanatory notes. We trust our customers not to break the copyright laws. If you are not satisfied with our product, return it within seven days and get your money back.

Orders to Sherston Software, 1 Noble Street, Sherston, Malmesbury, Wilts SN16 0NC. Cheques or P/O's payable to Sherston Software. Allow 28 days for delivery.

All software not currently available on the Spectrum soon will be!

SPECTRUM 16 OR 48K RUN RABBIT RUN

£4-95

inc. postage
SPECIAL OFFER
FREE

GAME TAPE
"CAT & MOUSE"
with every order



Eat the lettuces and carrots
before the farmers catch you.
Choice of speeds from slow
to Super Rabbit.



VIDEO PRODUCTIONS
101 LABURNUM ROAD,
REDCAR, CLEVELAND, TS10 3PF.

I enclose cheque / P.O. made payable to Video
Name _____ Productions
Address _____



Are your finances driving you mad?

Do you find that working out your finances makes your head buzz? Do you see red?

Don't worry, now you can have Hilton's **Personal Banking System** on your side, giving you a clear head start and (hopefully) putting you back into the black!

Maintain permanent records and fully detailed statements of your finances including:

★ All cheque book transactions and bank receipts

★ All standing order payments **Automatically Processed**

(monthly, quarterly, six-monthly or annually **and** for set number of payments)

In addition the ability to search, locate, delete or correct previous entries. List by category facility is included. Additional **Bank Reconciliation** module available to automatically match your Bank Statement to your **Personal Banking System** account. Full instructions included and **guaranteed** after sales maintenance provided.

★ **PBS ZX81 £8.95 (16K)**

★ **ZX SPECTRUM £9.95 (48K)**

★ **DRAGON £9.95 (32K)**

Bank reconciliation (for use with above) £5.

Ask for the PBS at your local computerstore.

ORDER by POST (specifying machine)

OR at the POST OFFICE using

TRANSCASH ACCOUNT 302 9557



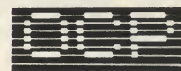
**HILTON
COMPUTER
SERVICES**

Hilton Computer Services Ltd
(Dept SU) 14 Avalon Road,
Orpington, Kent BR6 9AX

★ YOUR PBS IS NEVER OUT OF DATE ★

ALL YOU NEED TO CRACK MACHINE CODE

For the Spectrum 16k & 48k



Test tools for Spectrum & ZX81/TS1000

The ultimate professional tutor and de-bug program. We wrote this to help us write Machine Code!!

• Test and Display Machine Code instructions as they're written
• Ideal for both the beginner and expert • Fully documented with 32 page tutorial • HEX: Decimal converter as standard • PLUS • Character Generator of unbelievable quality!!

Full screen editor/assembler for Spectrum

The latest and most comprehensive Editor/Assembler yet produced.

• Full Screen 42 col. input/text editor • Assemble to screen/printer and or tape • Assemble derivatives DEFM, DEFS, DEFW, DEFB, DEFL, ORG, EQU, END • Comprehensive syntax check • Binary, Octal, HEX & ASCII constants • Will even operate as a simple word processor • Fully documented instruction book • Plus Character Generator ... plus, many, many more, all you've ever needed

Master tool kit for Spectrum

• Re-number facility • Delete copy and move block function • String search and substitute facility • Variable dump • Cross reference • Trace function • Real time clock and alarm system.

POST TO: OXFORD COMPUTER PUBLISHING LTD., P.O. BOX 99, OXFORD

Please send ☐ **Machine Code Test Tool ZX81**

☐ **Machine Code Test Tool Spectrum**

☐ **Editor Assembler** ☐ **Tool Kit**

£9.95 each, any 2 or more **£9.25** (Postage free UK only). Overseas add £1 per program.

NAME

ADDRESS

Also available from most branches of W. H. Smith and other retailers. Also from Buffer Micro, Streatham.

ACCESS CARD NO.

EXPIRY DATE

A world of activity for you and your Sinclair



Whether you have a ZX80, ZX81 or Spectrum — we can show you there's far more to your Sinclair than you ever thought possible. That's the *active, lively* world of **Sinclair User** — the first magazine written specially for everyone who owns or uses a Sinclair computer.

Every month, there is a whole range of games, business ideas and bright new ways to learn. There is the Sinclair User Club, with special exclusive member offers. There are technical facts, development news and advice, plus hints from other users and answers to queries — in fact everything you need to be an interested, informed and **ACTIVE** Sinclair user.

There's just one problem — **Sinclair User** sells out fast! So make sure you don't miss your copy: order it today from your newsagent — or complete the subscription form below and we will send it to you direct, every month.

Mail to: ECC Publications Limited, 30-31 Islington Green, London N1 8BJ

Please charge my credit card: Card name _____ Address _____

Name _____ Signature _____

Yes — I'd like to subscribe to _____

I enclose a cheque for £ _____ Number _____

Date _____

NB This offer applies to UK subscribers only. Overseas rates available on request.

Second
Edition Just
published

THE GOOD COMPUTING BOOK FOR BEGINNERS

PLUS a complete practical glossary of terms

If you only buy **ONE**
computing book

THIS IS THE CLASSIC!

An entertaining, but **thorough** reference source with the most readable, comprehensive glossary you'll find anywhere. The Good Computing Book for Beginners is an essential A-Z of all the facts you need to know about computing — and none you don't!

Whether you're brand new to computing, or an old hand keen to stay ahead, you'll score by keeping this classic, top-selling book within reach to use again and again.

The author, Dennis Jarrett, is a successful journalist who was also founder editor of Which Computer? magazine — so his first edition quickly became a standard work. Now this new, substantially enlarged and revised edition covers the latest trends, terms and technology with the relevant facts — and **ONLY** the relevant facts — in **plain English**.

Here's another fact you'll find fascinating: it will only cost you £2.95!

Use the coupon below to get your copy right away — or buy it soon from your bookshop. It's the **one** book you'll turn to again and again.

Please send me _____ copy(ies) of The Good Computing Book for Beginners by Dennis Jarrett at £2.95 each plus 50p post and packing. I enclose a cheque for _____
account Visa/Access/Diners/Amex number _____
Signature _____ Name _____ Address _____
Send to: _____ (please print clearly)
ECC PUBLICATIONS LIMITED
30-31 Islington Green
London N1 8BJ

WIN THE POOLS??

SPECTADRAW 2

THE NEW POOLS PREDICTION PROGRAM FOR THE 48K ZX SPECTRUM

Spectadraw 2 examines the recent form of teams playing in each week's English and Scottish Football League matches and then refers to a large database to see what has happened in the past when teams with similar form met. By combining the lessons learnt from the past with the teams current league position, it can then identify the matches which are likely to yield draws and output suitable predictions. The program will also predict the matches which are least likely to result in draws so that suitable fixed odds predictions can be made on home and away results.

The program is supplied complete with a database tape containing data on over 7500 matches, together with a comprehensive instruction manual. The database tape contains all results up to the date of dispatch.

Program, database and instruction manual
only **£12.95 inclusive**.

Mr B. S. McAlley
1 Cowleaze, Chinnor
Oxford OX9 4TD

HIGH RESOLUTION PROGRAMS FOR 16K ZX81

We utilise a SOFTWARE ONLY technique developed by Steve Briers BSc to produce a stable 248 by 224 pixel display. ABSOLUTELY NO HARDWARE MODIFICATIONS ARE REQUIRED FOR THE FOLLOWING PROGRAMS:

INVADERS —Game options—one or two players—taking turns or playing simultaneously. Adjustable bomb dropping and missile firing rates. Difficulty increases as game progresses. Advanced keyboard scanning routines to aid game playing.

SWARM —Fast moving arcade type game. Shoot down saucers as they dart across the screen firing their missiles. Progressive difficulty.

ZORF —An advanced arcade game incorporating five different sheets—invaders, galaxian, zorfians, meteorite shower and mother ship. Progressive difficulty.

GRAPHICS The program you've been waiting for! Enables you to use high resolution graphics in your own programs. Commands are CLS, PRINT, PLOT, POKE, DRAW, SPRITE and SCREENOFF. The SPRITE command allows you to define a shape and move it about the screen at will. Comprehensive editing facilities are provided and the graphics commands are easily incorporated into BASIC programs. Easy to follow instructions are included.

Send this coupon to **ODYSSEY COMPUTING,**
28 BINGHAM ROAD, SHERWOOD, NOTTINGHAM NG5 2EP.
Tick the programs you require.

☐ Invaders	£4.95	☐ Swarm	£3.95
☐ Zorf	£5.95	☐ Graphics	£5.95

I enclose a cheque/postal order for £ made payable to ODYSSEY COMPUTING.

NAME

ADDRESS

.....POSTCODE

**campbell
systems**

★put your Spectrum to work★

MASTERFILE

"The most comprehensive of the data-bases...."

Sinclair User June 1983

Design features

- ★ menu driven
- ★ fully machine coded
- ★ dynamic variable length file— NO WASTED SPACE
- ★ update, erase, copy any record
- ★ you have up to 32K per file
- ★ open ended — ready for microdrive

Files

- ★ up to 26 ITEMS per record
- ★ up to 128 characters per ITEM
- ★ save and load FILE independently of the program
- ★ search FILE for numeric or character comparison — on multiple levels

Display

- ★ up to 36 different user-defined ways of viewing selected data
- ★ sequence by ITEM or chronologically
- ★ 1-21 RECORDS displayed at a time
- ★ paging
- ★ printing
- ★ scrolling
- ★ TOTAL / AVERAGE any ITEM
- ★ optional USER-BASIC for tailored processing

Now accepted as the definitive filing system
for the 48K Spectrum

£15.00

Masterfile-16 a subset for the 16K Spectrum £8.95

DLAN Display Language

FOR ZX SPECTRUM 16K/48K

a simple, powerful machine coded interpreter for generating
dynamic textual display for use in advertising & education

THE HIT OF THE LAST MICROFAIR

- ★ DLAN commands are all single letter or symbol
- ★ define any window on the screen and recall as often as you like
- ★ print any text you like in any combination of 11 fonts, specially designed by Image Systems in a range of styles and sizes, some with proportional spaced letters
- ★ scroll your text any which way you choose within the window — or the whole screen if you wish
- ★ largest font size 3x2
- ★ word processing keeps left hand margin clean
- ★ BRIGHT, DULL, FLASH, STEADY
- ★ GOSUB equivalent
- ★ screen timing commands
- ★ 48K DLAN gives you 26K of space in which to place your display commands — 16K DLAN gives you 2K
- ★ 8-page manual

★★★★★

SPECIAL INTRODUCTORY OFFER £7.95

THE FAST ONE 16-64K ZX81

"One of the best data-management systems available for the ZX81."

Sinclair User June 1983 £12.00

GULPMAN

Spectrum 16/48K £4.95

GULP 2

ZX81 16K £4.75

Send your order with a cheque or postal order to Campbell Systems (Dept)
15 Rous Road, Buckhurst Hill, Essex IG9 6BL England Telephone 01 504 0589

All programs mailed 1st class by return. Prices
include VAT and postage within Europe. SAE for full list.

CS



MEMOTECH

The Complete Range

NEW PRICES
UP TO 37.5% OFF
PLUS FREE P+P!

Fifteen months ago Memotech developed the first 64K Memopak, designed to maximise the capabilities of the Sinclair ZX81. Since then, using the ZX81 as a starting point, we've gone on to produce a comprehensive range of Memopaks, adding 16K and 32K memory expansions, utilities packages comprising a Word Processor, Z80 Assembler and Spreadsheet Analysis, plus Communication Interfaces, High Resolution Graphics and a professional quality Keyboard.

To complete our range of ZX81 add-ons, we are now introducing the MEMOPAK RS232 Serial Interface.

RS232 Interface

The RS232 is an all-purpose interface which allows the ZX81 not only to output to suitable serial printers, but can link up with numerous types of peripheral or even other processors. The Interface has two main modes of operation: BASIC mode allows you to use the range of functions supplied in the RS232 EPROM within an ordinary BASIC program, and TERMINAL mode allows you to use your ZX81 as a terminal to another processor.

The EPROM functions offered permit the user to send, receive and convert bytes between ZX81 code and ASCII, as well as check the status of numerous control flags. Received or transmitted data can appear simultaneously on the screen, and received data may be printed simultaneously.

£39.95 inc. VAT

Memopak Centronics I/F

The BASIC commands LPRINT, LLIST and COPY are used to print on any CENTRONICS type printer. All ASCII characters are generated and translation takes place automatically within the pack. Reverse capitals give lower case. Additional facilities allow high resolution printing.

£24.95 inc. VAT

Memopak HRG

This pack breaks down the constraints imposed by operating at the ZX81 character level and allows high definition displays to be generated. All 248 x 192 individual pixels can be controlled using simple commands, and the built in software enables the user to work interactively at the dot, line, character, block and page levels.

£29.95 inc. VAT

Memocalc

The screen display behaves as a 'window' on a large sheet of paper on which a table of numbers is laid out. The maximum size of the table is determined by the memory capacity, and with a Memopak 64K a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified.

£29.90 inc. VAT

Memotext

Text is first arranged in 32 character lines for the screen with comprehensive editing facilities. On output the user simply chooses the line length required for printing and the system does the rest. Used with the Memopak Centronics Interface, the Word Processor makes available printout with 80 character lines, upper and lower case and single and double size characters.

£29.90 inc. VAT

Memopak Memory Extensions

For those just setting out on the road to real computing, these packs transform the ZX81 from a toy to a powerful computer. Data storage, extended programming and complex displays all become feasible. Further details available on request.

16K Memopak £24.95 32K Memopak £34.95
64K Memopak £49.95 Prices inclusive of VAT
MEMOPAKS ARE AVAILABLE AT MAIN
BRANCHES OF WH SMITH and JOHN MENZIES

Z80 Assembler

The Assembler allows you first to code and edit a source program in the Z80 language, and then assemble it into machine code. You can now write flexible and economic programs.

The Editor mode allows you to code directly in the right format, manipulate individual lines and control the exact placing of source and machine code. Routines may be merged or listed (even to a commercial printer using our Centronics Interface). The assembler mode handles all standard Z80 mnemonics, numbers in hex or decimal, comments and user-selected labels.

£29.90 inc. VAT



Memotech Keyboard

The Memotech plug-in Keyboard plus buffer pack takes the effort out of data entry for ZX81 users. The Keyboard has a light professional touch and is housed in an elegant aluminium case. The simple plug-in system means that you are not obliged to open up your ZX81, use a soldering iron or invalidate your ZX81 warranty.

Keyboard Buffer Pak

The Buffer Pak performs a "housekeeping" function for the Keyboard, interfacing directly with the port of your ZX81.

£34.95 inc. VAT



All Prices are inclusive of VAT, postage and packing.

To Order: Send your Name, Address, Memopaks required, plus a Cheque/Postal Order/Access/Barclaycard number (please state which) to: Memotech Limited, Station Lane Industrial Estate, Witney, Oxon. OX8 6BX. Telephone Witney 2977

We want you to be completely satisfied with your Memopak - all our products carry a 14 day money back guarantee.

EDUCATIONAL SOFTWARE

For children ages 4-11

EDUCARE'S 50

Fifty high-quality programs for primary education
Strongly recommended by educational authorities

on the
ZX81
with
SPECTRUM
SUPPLEMENT

on the
BBC
MICRO
(Model A and Model B)

WITH COLOUR, SOUND AND
OTHER ENHANCEMENTS

PROGRAMS WRITTEN IN
STRUCTURED FORM

£5.95 Paperback
122 pages

(All programs suit IK ZX81)

£7.95 Paperback
110 pages

NEW

These programs cover a wealth of basic concepts every child will meet in primary education. They are produced by professional educators and have been thoroughly tested in a primary school. Designed to go beyond drill & practice they promote learning through interaction and discovery. Programs range from counting and simple arithmetic to ones dealing with volume, balance and direction, mostly in form of games. Each program is short but powerful and comes with full documentation.

To:	Please send copies Educare's 50 on ZX81/Spectrum.
EDUCARE	 copies Educare's 50 on BBC Micro.
139a Sloane St.	I enclose cheque/postal order for £
London	Name
SW1X 9AY	Address

Let your child benefit early - Send now

SU

HIRE ZX81/SPECTRUM PROGRAM TAPES

Make the most of your computer by hiring from the original and still the only software library offering all these features:

■ Over 900 tapes stocked, offering more than 120 different programs from 39 suppliers (all with their permission)—many of the best currently advertised, plus some specially commissioned—and the range increases each week!

■ Arcade, adventure and simulation games, many business and home utilities, graphics, education...and so much more besides

■ Descriptive catalogue helps you make your choice

■ Free quarterly, illustrated magazine includes tips from a professional programmer, DIY plans, reviews,

letters, discount offers—and our **Top 40 Tapes** chart averaged from thousands of members' scores

■ Full-time staff offer you a friendly, efficient welcome & service

■ A fortnight's hire for just £1 + 40p p/p—hire what/when you like

■ All tapes guaranteed loadable

■ Help given with loading problems (azimuth test tape available) and with marketing members' programs

■ You may switch from ZX81 to Spectrum at any time

■ Send SAE for details—or join on money-back no-risk approval today



The SINCLAIR OWNERS' SOFTWARE LIBRARY

Warren Road, Liss, Hants GU33 7DD

Please send me on money-back approval my magazine, descriptive library catalogue and order form, on the understanding that if I'm not delighted with your service within 28 days you will refund my money in full.

NAME

ADDRESS

Please enclose cheque/P.O. for £8.50 (year's ZX81 membership)/£9.50 (Spectrum). Overseas £2 extra in each case.

SU

ZX SPECTRUM 16K AND 48K NEW SPORTS GAMES



New action sports games feature a 3D view of the game. In football and tennis you play one side, the computer plays the other. The computer is fast and hard to beat. Different skill levels.

FOOTBALL

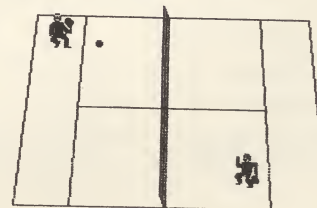
Each player can move, shoot etc. independently. Includes fouls if players collide, corners, throw ins etc. Scale 90 minutes play. Any team of names can be used. Game can be suspended and player numbers shown at the press of a key. **Price £5.50**

BIG MATCH SOCCER

Just like football game but for 2 players. Each player uses keys at his side of the keyboard to control his men. All men can be moved, shoot etc. independently. Practice with football then play your friends in the big match. **Price £5.50**

SUPER SOCCER

A deluxe version of the football. Even faster action, harder to beat. Choose team colours etc. **Price £7.00**



TENNIS

Each key plays a different stroke. Move your players anywhere on court. Computer plays a hard game. All tennis rules used, just like the real thing. Proper serving and scoring. Plays 3 sets. Animated figures. **Price £5.50**

TANK BATTLE

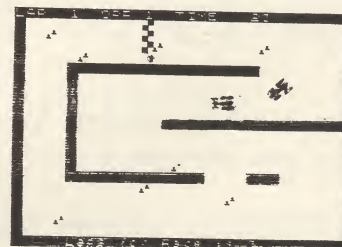
3D view from the tanks turret of woods, villages, attacking tanks etc. Shots can destroy buildings, trees and enemy tanks. 360 degree turret movement. **Price £4.50**

PINBALL

Flippers flashing lights etc. Like an arcade machine. **Price £3.95**

DESTROYER

Planes attack your ship with bombs, and submarines with torpedoes. Defend with guns and depth charges. **Price £3.95**



CAR RACE

You drive one car the computer the other. Control your car with steering and brakes. Choice of 2 circuits. Lapcounters and time recorded. **Price £3.95**

SPACE FIGHTER

Pilots eye view of space. Attack aliens, dock with refueling ship in flight. **Price £4.50**

SUPER SPACE INVADERS AND MAZE MUNCHER

Now both on one cassette, great value at only **£4.50**

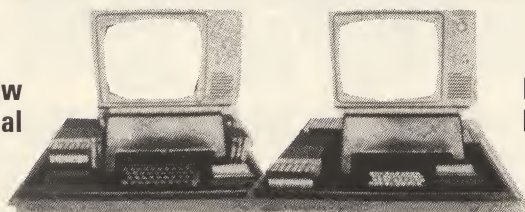
SUPER OFFER Spend £15 and get any extra game free

Please add 35p post and packing per order

WINTERS LTD, DEPT S.U, 24
SWANNINGTON CLOSE, CANTLEY,
DONCASTER, S/YORKS DN4 6UA

DESKTOP CONSOLE FOR ZX SPECTRUM/ZX81

New Deal



Lower Prices

TV/Monitor stand removable for access to add-ons, wiring, etc. Professional desktop console for the ZX Spectrum/ZX81. It raises and tilts the TV/Monitor to minimise eyestrain, holds in place the ZX printer, RAM packs (and other add-ons), power supply, tape recorder, ZX Microdrive and hides most of the wiring. Provides storage space for cassettes. Optional: Two built-in illuminated power switches. Console colour finish: Matt black. *SEE SPECIAL DEAL BELOW.

..... Date
YOUR NAME AND ADDRESS (In Capital Letters Please)
.....
.....

Qty	Description	Item Price	Total
	Console for ZX Spectrum/ZX81	£22.00	
	Power Switch for Tape Recorder	£3.00	
	Power Switch for ZX Spectrum/ZX81	£3.00	
	*1 Console complete with optional switches + 1 ZX Spectrum 48K	£150.00	

Cheques/P.O. made payable to:

COMPUTERLOCK,
2 WYCHPERRY ROAD,
HAYWARDS HEATH,
WEST SUSSEX RH16 1HJ
Telephone: (0444) 451986.

Sub Total

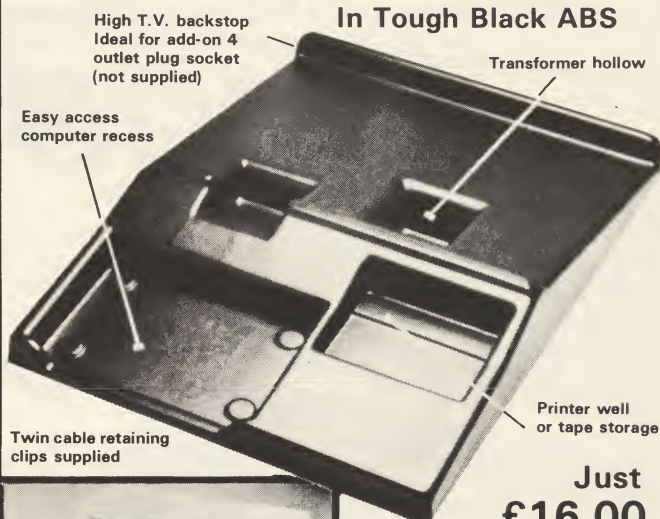
Post & Packing £3.50

Total Due

All Prices inclusive of V.A.T.
Allow 14 days for delivery.

AT LAST A 'SPECTRUM' COMPUTER DESK THAT HAS EVERYTHING!

In Tough Black ABS



Just £16.00

+ £2.00 p & p (inc VAT)

ZX81 Desk

£15.00 + £2.00 p & p (inc VAT)

P.H. Scientific Products
9, Southfield,
Welwyn Garden City,
Herts. Tel: (07073) 20241

FRENCH

VOCABULARY TEST

Makes learning French fun for both adults and children

A sophisticated program that makes full use of the Spectrum's graphics and sound capabilities

*Special introductory price of £3.95
Please state which version 16K or 48K*

Cheques or P.O.'s to:-

*Tutorial Software, P.O. Box 43,
Enquiry Office 22-29 Mill St.,
Newport, Gwent, NPT 3XZ.*

ZX81 MACHINE CODE ?

ZX.ASZMIC ROM gives:

- full screen editor
- multiple files
- powerful assembler
- complete debug
- hi-res graphics

ZX.Aszmic Rom replaces the Basic Rom in ZX81 to transform the machine into a complete Assembly Language Development station. Fast. Powerful. Professional. Reliable.

NEW! ASZMIC PLUG-IN EXTERNAL BOARD

accepts the Aszmic Rom to combine the best of machine code and basic. 24 I/O lines, Eprom programmer, 8k user socket. Aszmic alone, £39.95 including comprehensive manual. Aszmic + Board + Manual, only £54.90. Enquiries please enclose S.A.E.

COMPROCSYS LTD.,
P.O. Box 149, South Croydon,
Surrey, CR2 7YX

GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.

Bug — an error in a program.

EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultra-violet light. The memory can then be re-programmed using an electrical device called an EPROM blower.

Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.

Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.

Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.

Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.

Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.

Port — a link to the outside world which can be used by programs and the computer.

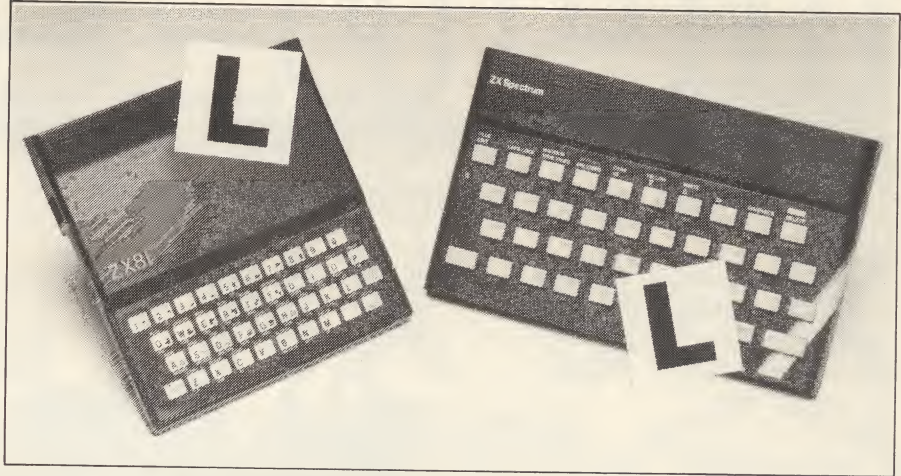
PCB — printed circuit board. A board which has on it the electronic circuits of the computer.

RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.

ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.

Software — programs which control the operation of the computer.

Syntax error — a bug caused by incorrect use of a programming language.



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you

find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

continued on page 102

Starting from Scratch

continued from page 101

able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is that important when using the ZX-81 that it is not jolted. Some of the connections can easily work loose and everything which has been entered will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and



LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

Usually they occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD "" followed by NEWLINE; then increase the volume of

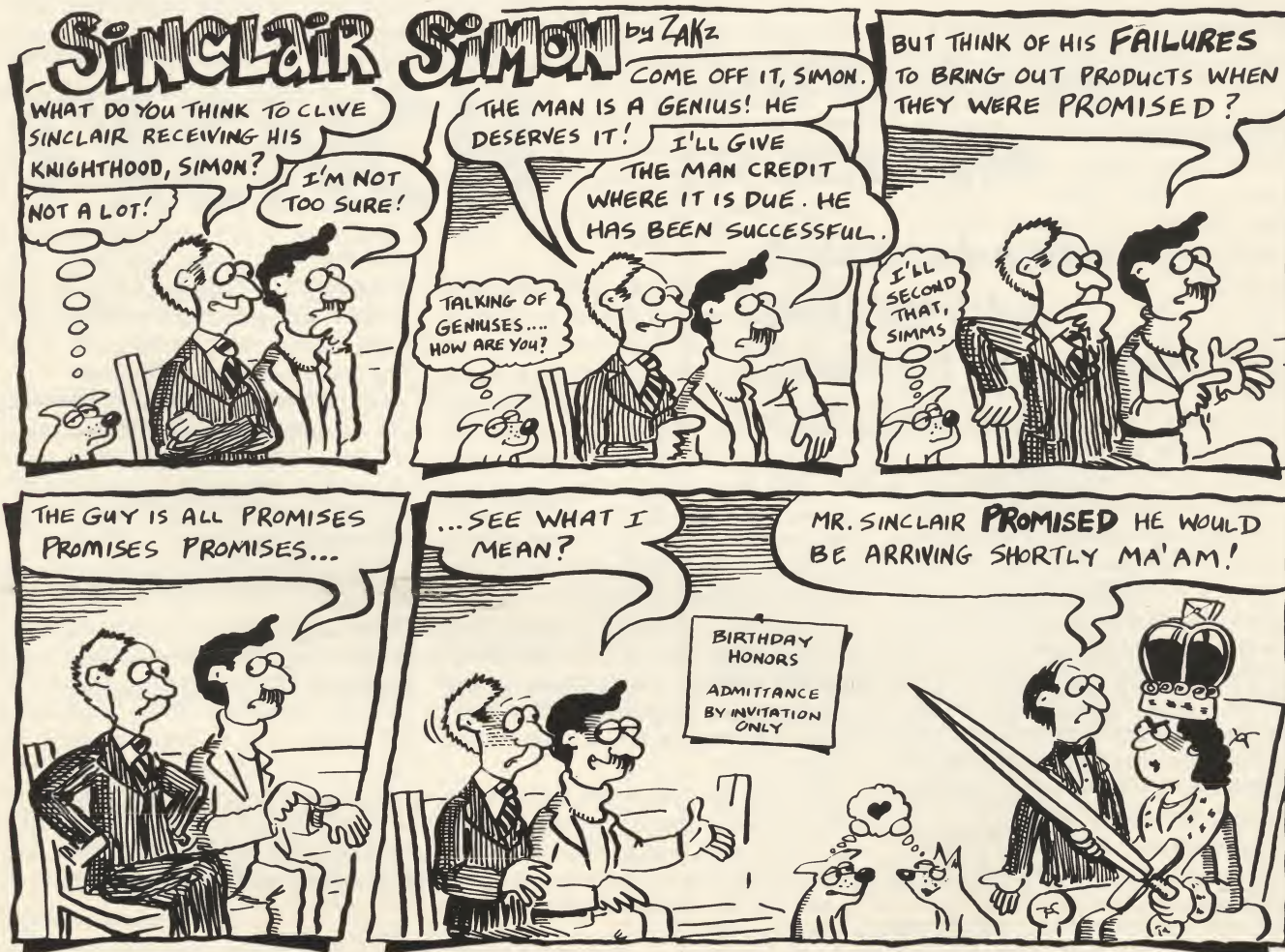
the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then rewind the tape, the program should LOAD normally.

LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours.



Spectrum

NEWS from SPECTRUM

IKON

HOBBIT FLOPPY TAPE DRIVE for the BBC Micro

Because there is a shortage of BBC Disk Drive up-grade kits, we have been able to secure a supply of IKON FLOPPY TAPE DRIVES for the BBC micro, which is an ideal alternative - see our ad for details.

ZX SPECTRUM

We have a large range of add-on goodies for the ZX SPECTRUM - see our ad you'll be amazed!

SOFTWARE

See our super range of SOFTWARE from top American & British companies

NEW SPECTRUM MEMBERS

Check our address page! - there are many new SPECTRUM dealers throughout the UK so there's a good chance there'll be a SPECTRUM centre near you.

PRESTEL

See PRESTEL Page 600181 for up to date information from SPECTRUM

AFTER SALES CARE

SPECTRUM service centres will ensure that should your machine 'go down' we will get it running again as quickly as possible. We also offer extended warranties at reasonable prices too! - ask your SPECTRUM HOME COMPUTER CENTRE for full details.

COMPUTER DEALERS

The SPECTRUM dealer list is virtually closed. If your area is free and you'd like to join the waiting list, please write to MIKE STERN, Spectrum (U.K.) Ltd, Burrowfields, Welwyn Garden City, Herts.

Just arriving - the new

LYNX 96K



More
power!
More
features!

Now from SPECTRUM - the new LYNX 96K offering more workspace for ambitious programs. The most important feature of the 96K machine is its additional memory. In full high resolution colour, it provides 37.5K of RAM directly accessible in Basic - with up to 24K more available to programs using machine code. The extra memory of the 96K machine helps you make the most of the outstanding features it shares with the 48K Lynx: remarkably high resolution graphics and the highly praised Lynx Basic with its built-in machine-code monitor. Additional ROM features on the LYNX 96K include drivers for both parallel and serial printers, and a range of preformatted sound effects. Ask to see the super new LYNX 96K at SPECTRUM - NOW!

SPECTRUM PRICE

£299.00

LYNX 48K Model -SPECTRUM PRICE £225

For the 48K Lynx owners who're ready to take the next step, the 48K machine can be upgraded to full 96K specification for just £89.95

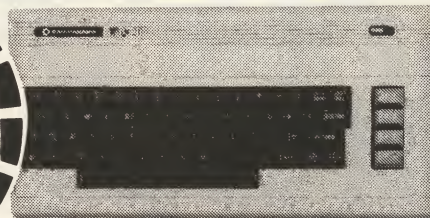
Commodore VIC-20 Package Deal



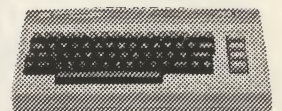
A complete Home Computer system including the VIC-20 Computer, a Cassette Unit, Introduction to BASIC part 1 - a simple explanation of computer programming. A tape of four computer programs - Blitz, Type-A-Tune, Race & Hoplit. A fantastic deal!! and great value-for-money check it out at your local SPECTRUM dealer NOW! But HURRY! this is a limited offer only while stocks last.

**Sensational
Value ONLY**

£139.99



COMMODORE 64



Powerful 64K RAM - 40-colour displays to monitor TV. High resolution graphics and 3-dimensional effect capability, music synthesiser. Z80 additional processor option.

Spectrum Price

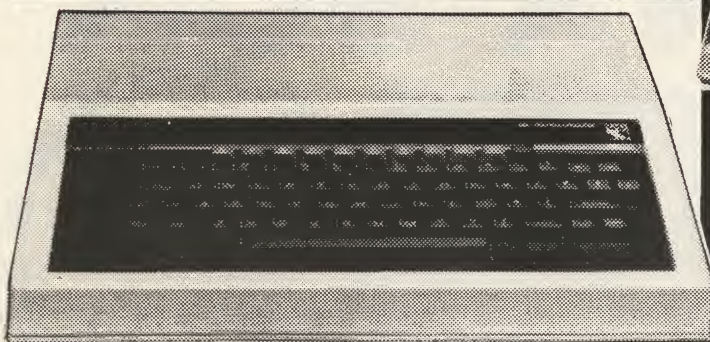
£345.00

Package Deal offer does not apply to Commodore 64 Model

TURN THE PAGE FOR MORE SUPER OFFERS FROM SPECTRUM

SPECTRUM

BBC Model 'B' MICRO



Yes, this top selling Micro system is now available from your local SPECTRUM dealer - the BBC Model 'B' offering 32K RAM plus a full back-up of peripherals & software too! It's an infinitely expandable machine, ideal for the home or business and is already widely used for educational purposes in schools - so the chances are your children may already be well familiar with its operation, which must make it the ideal choice for the home too!

Now available

IKON FLOPPY TAPE DRIVE
for the BBC The ideal alternative!

Spectrum
Price **£155.25**

QUICK SHOT JOYSTICK
Especially for the BBC
Spectrum Price £19.95

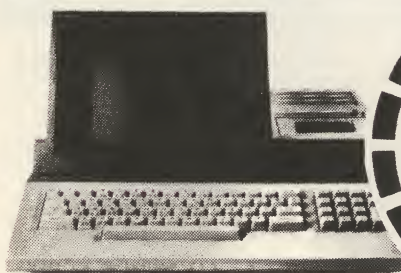
SPECTRUM PRICE

£399.00 INC. VAT

BBC Single Disk Drive 100K £265.00
BBC Dual Disk Drive 800K £803.85
BBC Tape Recorder £29.90
Acorn Software Cassette based from £9.95
Acorn Disk based software £11.50
BBC cassette based software from £9.95

Please note! We regret that there is a shortage on all BBC equipment - please phone your nearest store before making a journey to check stock position.

SHARP MZ-80A

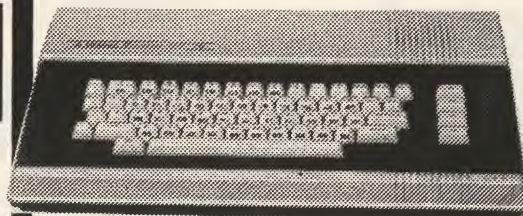


Desk top genius! the all-in-one SHARP MZ-80A. Ready to run the moment you get it home. Built-in keyboard. CRT 9" display and cassette data storage with 48K RAM. The BASIC with extra useful additions, offers quite a powerful micro for the home or business ■ 4K Byte ROM 48K Byte RAM - 2K Byte Video RAM ■ ASC11 profiled keyboard - numeric pad ■ 2 Page Video RAM allows screen to be scrolled up or down. ■ CP/M available.

FREE!
£75 WORTH
of software
with every MZ80A purchased

£546.25

Floppy Disks and Accessories for MZ-80A
Twin Floppy Disk Unit (inc. 1/0 Card, Disk, Cable) £856.75
Twin Disk Unit (only) £678.50
Single Floppy Disk Unit £460.00
Cable for F/D Drive £29.79
Printers and Accessories for MZ-80A, MZ-80B & MZ-80K
80 Col Tractor Feed Printer inc. Cable, 1/0 Card & Rom. £477.25



The Super COLOUR GENIE

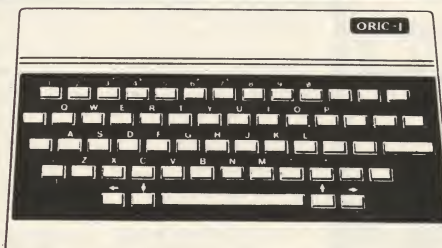
A truly reliable micro and highly recommended by SPECTRUM featuring powerful and sophisticated COLOUR GRAPHICS, allowing you to create full 8-colour Games, Diagrams and charts quickly and simply. **Powerful 16K RAM** memory (expandable internally to 32K) for **FULL COLOUR** video games and **POWERFUL COMPUTING** with a full range of **inexpensive accessories**: 16K RAM pack, Joysticks for TV games, Light Pen, Disk Drive and a Printer. The superb Colour Genie is at SPECTRUM now - check it out and see the Genius at work!

SPECTRUM PRICE

£194.00

COLOUR GENIE ACCESSORIES
Joysticks £49.49
16K RAM £38.50
Printer interface £39.95
VISCOUNT Teach yourself Colour Genie Basic £6.95

ORIC-1



Special OFFER! FREE!

4 programs with every ORIC-1 48K purchased.

- Multigames
- Oric Flight
- Chess
- Zodiac

Spectrum Price ONLY

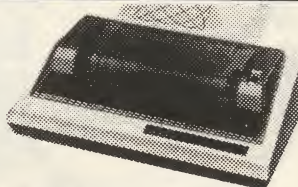
£169.95

A superbly designed and engineered micro and great value-for-money from SPECTRUM. Offering **48K RAM Colour** - (8 foreground and 8 background can be displayed at the same time) **High resolution graphics** User definable Graphics. **Full sound** (6 octaves of controllable sound) **Easy to use keyboard with moving keys**. **Standard Centronics parallel interface** allows easy connection to a wide range of printers etc.

SPECTRUM FACTS
Maximum user RAM 47,870 Bytes
Text Screen 25x40
High Resolution 240x200
Cassette Lead Included

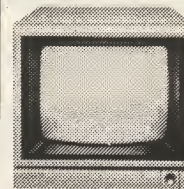
Now available: P.A.S.E. joystick interface for ORIC-1 £14.95

PRINTERS



EPSON
Model FX-80 £503.70
Model RX-80 £332.35
SEIKOSHA
GP-100A £229.94
GP-100VC £247.25
SMITH CORONA
Model TP-1A £431.25
OKI MICROLINE
Model 80 £259.90
Model 82A £455.40
Model 92P £585.35
All prices include VAT

MONITORS



SANYO CDD 3125NB
Colour Monitor
£286.35
SANYO 12"
Green Monitor
£113.85
All prices inc. VAT

THE PLUG

Ever had your micro crash on you when you were in the middle of a complex program because some other electrical appliance was switched on and caused a power fluctuation? THE PLUG is designed especially to overcome this problem.

only **£14.95**

ALL PRICES INCLUDE VAT

Not all stores carry every advertised item, please phone before making a journey - Prices correct at time of going to press E. & O.E.

SOFTWARE

THE TOP SELLERS from

SOFTSEL[®]

American games for the U.K. market from leading American software houses

ATARI		
Donkey Kong Atari (Cart)	£41.70	
Dig Dug Atari (Cart)	£30.00	
AVOLON HILL		
Computer Stocks & Bonds Com 64 (Cass)	£16.56	
Midway Campaign Com 64 (Cass)	£16.56	
Telengard Atari (Disk)	£23.18	
BRODERBUND		
Choplifter Atari (Disk)	£28.93	
Apple Panic Atari (Disk)	£24.79	
AE Atari (Disk)	£26.93	
Seafox Atari (Disk)	£24.79	
Bank Street Writer Atari (Disk)	£56.31	
BIG FIVE SOFTWARE		
Miner 2049er Atari (Cart)	£41.70	
DATASOFT		
Zaxxon Atari (Disk)	£33.07	
EDUCATIONAL SOFTWARE		
Tricky Tutorials 1 to 6 Atari (Disk)	£96.97	(For the 6)
EPYX/AUTOMATED SIMULATIONS		
Jump Man Com 64 (Disk)	£33.07	
Temple of Apsah Atari/Vic 20 (Disk)	£33.07	
HEYDEN		
Sargon 2 Atari (Disk)	£28.93	
Cass	£24.79	
HUMAN ENGINEERED SOFTWARE		
Turtle Graphics Com 64 (Cart)	£49.15	
Vic 20 (Cart)	£32.75	
Heswiter Com 64 (Cart)	£36.85	
Vic 20 (Cart)	£32.75	
Predator Vic 20 (Cart)	£33.35	
CoCo II Com 64 (Disk)	£33.07	
Vic 20 (Disk)	£13.20	
Simon Vic 20 (Cass)	£14.85	
Torg Vic 20 (Cass)	£14.85	
6502 Professional Development System Com 64 (Cass)	£24.11	
Vic 20 (Cass)	£24.11	
INFOCOM		
Zork 1, 2 & 3 Atari (Disk)	£33.07	
Com 64 (Disk)	£33.07	(each game)
Deadline Atari (Disk)	£41.35	
Suspended Com 64 (Disk)	£41.35	
THE MUSE SOFTWARE		
Castle Wolfenstein Atari (Disk)	£22.97	
LIGHTNING SOFTWARE		
Master Type Atari (Disk)	£32.16	
MIS		
Vic Vango Vic 20 (Cass)	£10.71	
Fruit Fly Vic 20 (Cass)	£10.71	
PROGRAM DESIGN		
Pre-school IQ Builder Atari (Disk)	£19.26	
Cass	£13.77	
ROCKLAN		
Wizard of Wor Atari (Disk)	£33.07	
Cart	£37.52	
SIERRA ON-LINE		
Frogger Atari (Disk)	£27.27	
Com 64 (Disk)	£26.93	
Ultima II Atari (Disk)	£49.63	
Ultima II Vic 20 (Cass)	£24.79	
SIRIUS SOFTWARE		
Repton Atari (Disk)	£30.64	
Com 64 (Disk)	£33.07	
Fast Eddy Com 64 (Disk)	£28.93	
Vic 20 (Cart)	£33.35	
Squish'em Com 64 (Disk)	£26.93	
Type Attack Vic 20 (Cart)	£33.35	
Turnoil Vic 20 (Cart)	£33.35	
SPINNAKER		
Story Machine Atari (Disk)	£28.14	
Rhymes & Riddles Atari (Disk)	£24.11	
Snooper Troops Atari (Disk)	£36.19	
Hey Diddle Diddle Atari (Disk)	£24.11	
In search of the Most Amazing Thing Atari (Disk)	£32.16	



The TOP 50 from MICRO DEALER UK

NEW RELEASES FROM QUICKSILVA



ZX81

NEW RELEASES FROM QUICKSILVA



SPECTRUM

The best of British software from leading British software houses

SOFTWARE HOUSE	TITLE	
(A) ZX SPECTRUM		
MELBOURNE HOUSE	"TERROR-DAKTIL"	£6.95
MELBOURNE HOUSE	"PENETRATOR"	£6.95
MELBOURNE HOUSE	"THE HOBBIT"	£14.95
QUICKSILVA	"ASTRO BLASTER"	£4.95
QUICKSILVA	"TIMEGATE"	£6.95
QUICKSILVA	"MINED OUT"	£4.95
QUICKSILVA	"TRADER TRILOGY"	£9.95
ARTIC COMPUTING	"3-D COMBAT ZONE"	£4.95
ARTIC COMPUTING	"COSMIC DEBRIS"	£4.95
ARTIC COMPUTING	"QUADRACUBE"	£4.95
IMAGINE	"ARCADIA"	£5.50
NEW GENERATION	"KNOT IN 3-D"	£5.95
NEW GENERATION	"3-D TUNNEL"	£5.95
HEWSON	"HEATHROW A.T.C."	£7.95
P.S.S.	"MAZE DEATH RACE"	£4.95
SOFTK	"THE SOFTK COMPILER"	£9.95
RICHARD SHEPHERD	"TRANSYLVANIAN TOWER"	£6.50
MICROGAME SIMULATION	"BATTLE OF BRITAIN"	£5.95
CP SOFTWARE	"SUPERCHESS II"	£7.95
ABBEX	"E.T.X."	£5.95
C.R.L.	"TEST MATCH"	£5.95
(B) ZX-81		
QUICKSILVA	"COSMIC GUERILLA"	£3.95
QUICKSILVA	"3-D BLACK STAR"	£4.95
C.R.L.	"HI-RES GRAPHICS TOOLKIT"	£5.95
MARTECH GAMES	"CONFLICT" (Specialist War Game)	£11.95 (ZX-81 or ZX-SPECTRUM)
(C) COMMODORE VIC-20		
LLAMASOFT	"MATRIX"	£6.00
LLAMASOFT	"GRIDRUNNER"	£6.00
LLAMASOFT	"ANDES ATTACK"	£6.00
QUICKSILVA	"TORNADO"	£5.95
SOFTWARE HOUSE	TITLE	
IMAGINE	"ARCADIA"	£5.50
POSTERN	"SHADOWFAX"	£7.95
RABBIT	"SCRAMBLE"	£9.99
INTERCEPTOR MICROS	"CRAZY KONG"	£6.00
(D) COMMODORE 64		
LLAMASOFT	"MATRIX"	£6.50
LLAMASOFT	"GRIDRUNNER 64"	£6.50
LLAMASOFT	"ATTACK OF THE MUTANT CAMELS"	£6.50
INTERCEPTOR MICROS	"PANIC 64"	£6.95
(E) ORIC-1		
I.J.K. SOFTWARE	"XENON-1"	£8.50
I.J.K. SOFTWARE	"3-D MAZE"	£1.50
SALAMANDER	"ORIC-TREK"	£9.95
(F) DRAGON-32		
QUICKSILVA	"MINED OUT"	£5.95
P.S.S.	"DRAGBUG"	£12.95
C.R.L.	"ST. GEORGE & THE DRAGON"	£6.95
C.R.L.	"HANDICAP GOLF"	£5.95
SALAMANDER	"DRAGON TREK"	£9.95
(G) B.B.C. (A&B)		
I.J.K. SOFTWARE	"STRATOBOMBER"	£7.50
I.J.K. SOFTWARE	"ATLANTIS"	£7.50
QUICKSILVA	"PROTECTOR"	£7.95
QUICKSILVA	"WIZARD"	£6.95
QUICKSILVA	"MUSIC PROCESSOR"	£14.95
DIGITAL FANTASIA	"ESCAPE FROM PULSAR 7"	£8.95
DIGITAL FANTASIA	"FEASIBILITY EXPERIMENT"	£6.95

Compiled by Micro Dealer U.K., Distributors of fast-selling Micro Computer Software

Plus!
THE BEST SELLERS
from these top British
Software houses



Cruising (Dragon 32)	£6.95
Cruising (ZX Spectrum)	£4.95
Blind Alley (ZX Spectrum)	£4.95
Androids (ZX Spectrum)	£5.95
Galaxy Attack (ZX Spectrum 48K)	£5.95
Sword Fight (ZX Spectrum)	£5.95

RABBIT

Cyclons - Commodore 64	£5.99	Pakacuda - Vic 20	£5.99
Escape MCP - Commodore 64	£5.99	Race Fun - Vic 20	£5.99
Pakacuda - Commodore 64	£5.99	Anti-Matter Splatter - Vic 20	£5.99
Paratrooper - Vic 20	£5.99	Cyclons - Vic 20	£5.99
Annihilator - Commodore 64	£5.99	The Catch - Vic 20	£5.99

TITAN

TITAN		
Alien Swarm Spectrum 16/48K	£5.95	
Galactic Raiders Spectrum 16/48K	£4.95	
Ground Force Zero Spectrum 16/48K	£4.95	
Missile Panic Vic-20 3.5K	£4.95	
Roadrunner Vic-20 3.5K	£4.95	
Android Attack Vic-20 3.5K	£4.95	
Space Hopper Vic-20 3.5K	£4.95	
Mission 99 T199/4A STD M/C	£4.95	

COMPUTER RENTALS

High Resolution (ZX-81)	£5.95	Testmatch	£5.95
Galactic Patrol (Spectrum 16K)	£5.95	Handicap Golf	£5.95
For Spectrum 48K	£5.95	Alien Maze	£5.95
Derby Day	£5.95	3D Desert Patrol	£4.95
Rescue	£5.95	St. George & the Dragon (Dragon 32)	£6.95
Jackpot	£4.95		

MICRODEAL

DRAGON		Alcatraz	£6.00
The King	£6.00	Katerpillar Attack	£8.00
Space War	£6.00	Space Monopoly	£8.00
Defence	£6.00	Mansion Adventure	£6.00

MIKROGEN

Mikrogen			
Bomber (ZX81)	£3.95	Masterchess (Spectrum)	£6.95
Scramble (ZX81)	£3.95	Scramble (Spectrum)	£5.95
Space Invaders (ZX81)	£3.95	Space Zombies (Spectrum)	£5.95
Frogs (ZX81)	£3.95	Panic (Spectrum)	£5.95
ZX Chess (ZX81)	£6.50	Mad Martha (Spectrum)	£6.95

BOOKS

GRANADA PERSONAL COMPUTING TITLES		The Working Commodore 64	£5.95
The ZX Spectrum and how to get the most from it	£5.95	Commodore 64 Machine Code Master	£6.95
The Spectrum Programmer	£5.95	The Working Dragon	£5.95
The Spectrum Book of Games	£5.95	The Working Spectrum	£5.95
Introducing Spectrum Machine Code	£7.95	The Working CBM 64	£5.95
The Apple II Programmer's Handbook	£10.95	Dragon 32 Games Master	£5.95
Programming with Graphics	£5.95	Functional Forth for the B.B.C.	£5.95
The Dragon & how to make the most of it	£5.95	Androids for the 16K Spectrum	£5.95
Computing for the Hobbyist & small Business	£6.95	Sword Fight for 16K Spectrum	£5.95
Simple Interfacing Projects	£6.95	Galaxy Attack for 48K Spectrum	£5.95
The BBC Micro: An expert guide	£6.95	Blind Alley for 16K Spectrum	£5.95
Commodore 64 Computing	£5.95	Cruising for 16K Spectrum	£5.95
The Oric-1 and how to get the most from it	£5.95	PRENTICE HALL	£5.95
The Dragon 32 book of games	£5.95	The Apple Personal Computer for Beginners	£6.95
Computer Languages and their uses	£5.95	Atari Games and Recreation	£12.70
Lynx Computing	£6.95	BASIC Programming on the BBC Microcomputer	£5.95
21 Games for the BBC Micro	£5.95	The ZX Spectrum - Your Personal Computer	£5.95
Choosing a Microcomputer	£4.95	Commodore 64 Programmer's Reference Guide	£14.95
Databases for fun & profit	£5.95	The PET Personal Computer for Beginners	£5.95
Introducing the BBC Micro	£5.95	VIC 20 Programmer's Reference Guide	£9.95
SUNSHINE		Osborne User's Guide	£12.70
The Working Spectrum	£5.95	The C Programming Language	£16.95
Functional Forth for the BBC	£5.95	Starting FORTH	£15.25
The Working Dragon 32	£5.95		
Dragon 32 Games Master	£5.95		

ACCESSORIES

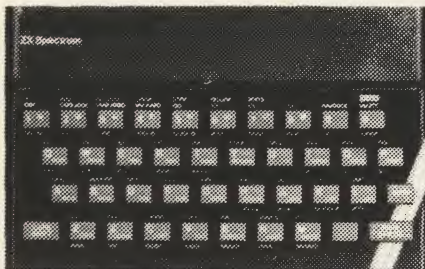
C12 DATA CASSETTES	£0.50
C15 DATA CASSETTES	£0.50
VISCOUNT SINGLE SIDED, DOUBLE DENSITY (10) (FOR APPLE, COMMODORE, ATARI, TANDY)	£21.25
VISCOUNT SINGLE SIDED, SINGLE DENSITY (10)	£21.25
VISCOUNT DOUBLE SIDED, DOUBLE DENSITY (10) (FOR SHARP SUPERBRAIN, ETC.)	£33.61
VISCOUNT SINGLE SIDED DOUBLE DENSITY 96 TRACK (10) (FOR NASCOM, COMMODORE 8050, ETC.)	£31.36
EMPTY DISK CASES (FOR 5 1/4" DISKETTES)	£1.95
DISK HEAD CLEANER KIT	£16.10
TELEVISIONS	
12" T80 B&W PORTABLE	£59.95
CTP3131 14" COLOUR PORTABLE	£229.95

Teach yourself BASIC
cassette available for most
popular micros -
viscount
all £6.95

TURN THE PAGE FOR MORE SUPER OFFERS FROM SPECTRUM

Spectrum

SINCLAIR ZX SPECTRUM



This top selling micro is now available from Spectrum in both 16K and 48K RAM.

**SINCLAIR
ZX SPECTRUM
16K
£99.95**

**SINCLAIR
ZX SPECTRUM
48K
£129.95**

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

Just look at this fantastic range of add-on goodies for the ZX Spectrum!

VISCOUNT 32K RAM PACK..... £39.95
SPECTRUM/TV SOUND UNIT
Control sound of your ZX-Spectrum
through volume control on T.V. only £9.95

Fuller
MASTER UNIT
Combines all the features
of both ORATOR and the
FULLER BOX at the amaz-
ingly low price of
ONLY £54.95

**ORATOR VOICE
SYNTHESIS
FOR
ZX SPECTRUM
ONLY £39.95**

Fuller
**16K RAM
ONLY
£24.95**

**THE AMAZING
FULLER BOX**
Features: Programmable
Sound, Joystick Con-
troller, Cassette Interface,
Beep Amplifier, Thru Buss,
Volume Control
ONLY £29.95

Fuller
**FD 42 KEY-
BOARD FOR
ZX81
SPECTRUM
ONLY £29.95**

Fuller
**SPECTRUM
SOUND
AMPLIFIER
ONLY £6.95**

**DIGITAL
TRACER**
from RD
Labs

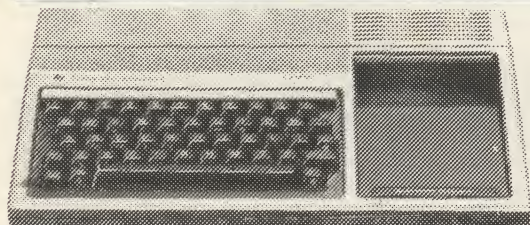


SPECTRUM PRICE £55.50

ZX-81 ACCESSORIES

**64K RAM Pack....£54.95
16K RAM Pack....£24.95
ZX Printer£39.95**

TEXAS TI-99/4A



**PLUS
FREE!**

■ SPEECH SYNTHESISER or a
■ TI CASSETTE RECORDER

each worth **£49.95**

When you buy any 6 Texas Software modules.
Please ask for details. Subject to availability

Yes, now from SPECTRUM the fabulous
TEXAS TI-99/4A Home Micro for only
£149.95 plus a super FREE! offer too!
Worth **£50.85** (which means you're
effectively only paying **£99.10** for your
TEXAS TI-99/4A micro.) Hurry! this is a
limited offer only

Including FREE!
■ Pair of Joyicks ■ Begin-
ners BASIC Tutor program
■ Connect Four program

worth **£50.85**

£149.95

HURRY!
Limited
Offer
only -
Ask for
details

ATARI 800



**Fantastic!
NEW
LOW
Price**

Now this proven and tested machine has been upgraded to a massive
48K RAM and its still at the amazing **LOW** price of **£299.95** from
SPECTRUM. It's an ideal Home Micro for graphics, educational and per-
sonal finance etc. use it and it will take you from learning up to a small busi-
ness use. You can add printers, program recorders, disk drives and more,
to expand your micro as and when you want, to suit your needs. So if you're
looking for a top of the line micro you must see the **ATARI 800** with **48K** at
SPECTRUM - NOW!

**NOW
ONLY £299.95**

**ATARI 400
16K RAM
NOW ONLY**

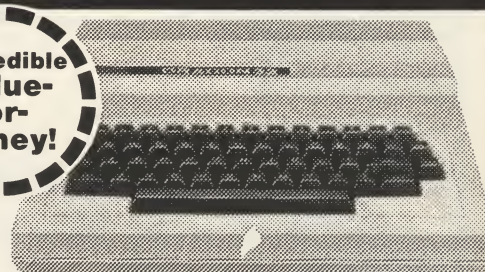
£149.95



**Including FREE
Programming Kit**

Plus a wide range of other peripherals & software for ATARI from
your local SPECTRUM dealer - See our SOFTWARE page!

DRAGON



Extensive facilities include
highly advanced colour
graphics. Powerful standard
32K RAM (expandable to 64K
Bytes). ● 9 Colour 5 resolu-
tion Display ● Extended
Microsoft colour BASIC (as
standard) ● Advanced sound
with octaves -255 tones.

SPECTRUM FACTS
Maximum user RAM
..... 29,679 Bytes
Text Screen 16 x 32
High resolution 256 x 192
Cassette Lead Included
VISCOUNT Teach yourself
Dragon Basic..... £6.95

**SPECTRUM
PRICE
ONLY**

£175.00

Plus a wide range of other peripherals & software for
DRAGON from your local SPECTRUM dealer - See
our SOFTWARE page!

There's a Spectrum Centre near you ...

AVON

BATH Software Plus, 12 York St. TEL: (0225) 61676
BRISTOL Brensal Computers Ltd., 24 Park Row. TEL: (0272) 294188
WESTON-SUPER-MARE K. & K. Computers, 32 Alfred St. TEL: TBA

BEDFORDSHIRE

BEDFORD Stanad Ltd., 115 Midland Rd. TEL: (0234) 49341
DUNSTABLE Dormans, 7-11 Broad Walk. TEL: (0582) 65515
LUTON Terry-More, 49 George St. TEL: (0582) 23391/2

BERKSHIRE

READING David Saunders Computer Centre, 8 Yield Hall Place. TEL: (0734) 580719

BUCKINGHAMSHIRE

CHESHAM Reed Photography & Computers, 113 High St. TEL: (0494) 783373
LEIGHTON BUZZARD The Computer Centre at Milton Keynes Music, 17 Bridge St. TEL: (0525) 382504, 376622
WINDSOR Wycombe Video, 44 King Edward Court. TEL: (07535) 67441

CAMBRIDGESHIRE

CAMBRIDGE K. P. Ltd., 12a Kings Parade. TEL: (0223) 68087
PETERBOROUGH Peterborough Communications, 91 Midland Rd. TEL: (0733) 41007

CHANNEL ISLANDS

GUERNSEY Guit's, 3-5 The Pellet, St. Peter Port. TEL: (0481) 24682
JERSEY Audio & Computer Centre, 7 Peter St. Heller. TEL: (0534) 74000

CHESHIRE

ALTRINCHAM Mr. Micro, 28 High St. TEL: TBA (Phone (061) 728 2282 for info.)
CREWE Microman, Unit 2, 128 Nantwich Rd. TEL: (0270) 216014
CHESTER Oakleaf Computers Ltd., 100 Boughton. TEL: (0244) 310099
MACCLESFIELD Camera & Computer Centre, 118 Mill St. TEL: (0625) 27468
NORTHWICH Camera & Computer Centre, 3 Town Sq. TEL: (0606) 45629
STOCKPORT Wilding Ltd., 1 Little Underbank. TEL: (061) 480 3435
WARRINGTON Wildings, 111 Bridge St. TEL: (0925) 38290
WILMSLOW Swift of Wilmslow, 4-6 St. Annes Parade. TEL: (0625) 526213

CLEVELAND

MIDDLESBROUGH McKenna & Brown, 190 Linthorpe Rd. TEL: (0642) 248345

CORNWALL

ST. AUSTELL A B & C Computers, Duchy House, 6 Lower Aylmer Sq. TEL: (0726) 64463

CUMBRIA

BARROW-IN-FURNESS Barrow Computer Centre, 96 Church St. TEL: (0229) 38353
CARLISLE The Computer Centre, 56-58 Lowther St. TEL: (0228) 27710
WHITEHAVEN P. D. Hendren, 15 King St. TEL: (0946) 2063

DERBYSHIRE

ALFRETON Gordon Harwood, 69/71 High St. TEL: (0773) 832078
DERBY C T Electronics, at Camera Thorpe, The Spot. TEL: (0332) 360456

DEVON

EXMOUTH Open Channel, 30 The Strand, TEL: (03952) 4408

PAIGNTON Devon Computers, 81 Upper Manor Rd. TEL: (0803) 526303

DURHAM

DARLINGTON McKenna & Brown, 102 Bondgate. TEL: (0325) 59744

ESSEX

BASILDON Godfrey's 28-32 East Walk, Town Centre. TEL: (0268) 289379
CHELMSFORD Maxton Hayman Ltd., 5 Broomfield Rd. TEL: (0245) 354595
ILFORD Prot Enterprises, 1 Centreway, High Rd. (next to Sainsbury's) TEL: (01) 553 0144
LOUGHTON Micro & Movie Channel, 309 High Rd. TEL: (01) 508 1216
RAINHAM Microway Computers, 39 High St. TEL: (0634) 376702

GLOUCESTERSHIRE

GLOUCESTER The Model Shop, 79-81 Northgate St. TEL: (0452) 410693

HAMPSHIRE

ALDERSHOT David Saunders Computer Centre, 51 Station Rd. TEL: (0252) 20130
BASINGSTOKE Fisher's, 2-3 Market Place. TEL: (0256) 22079
PORTSMOUTH Computer Corner, 261 Commercial Rd. TEL: (0705) 833938
PORTSMOUTH Waterlooville G B Microland, 7 Queens Prde. TEL: (07014) 59911
SOUTHAMPTON R. J. Parker & Son Ltd., 11 Portsmouth Rd., Woolston. TEL: (0703) 434137/8
WINCHESTER Winchester Camera & Computer Centre, 75 Parchment St. TEL: (0962) 53982 (Just Opening)

HEREFORD

HEREFORD Melgray Hi-Tech Ltd., 49 Broad St. TEL: (0432) 275737

HERTFORDSHIRE

HATFIELD Microworld, 2 Crawford Rd. TEL: (07072) 64137
HEMEL HEMSTEAD Faxminster Ltd., Computer & Electrical Discount Centre, 25 Market Sq. TEL: (0442) 55044
HITCHIN Camera Arts (Micro Computer Division), 68a Hermitage Rd. TEL: (0462) 59285
POTTERS BAR The Computer Shop, 197 High St. TEL: (0707) 44417
ST. ALBANS (Herts) Clarke Computer Centre, 14/16 Holywell Hill. TEL: (0727) 52991
STEVENAGE D. J. Computers, 11 Town Sq. TEL: (0438) 65501
WATFORD SRS Microsystems Ltd., 94 The Parade, High St. TEL: (0923) 26602

HUMBERSIDE

GRIMSBY R. C. Johnson Ltd., 22 Friargate, Riverhead Centre. TEL: (0472) 42031

ISLE OF MAN

DOUGLAS T. H. Colbourne Ltd., 57-61 Victoria St. TEL: (0624) 3482 (Just Opening)

KENT

CANTERBURY Kent Micro Systems, Conquest House, 17 Palace St. TEL: (0227) 50200
SEVENOAKS Ernest Fidler Computers, Dorset St. TEL: (0732) 456800

LANCASHIRE

ACCINGTON PV Computers, 38A Water St. TEL: (0254) 36521/32611
BURNLEY IMO Computer Centre, 39-43 Standish St. TEL: (0282) 54299
BURY (Lancs.) Micro-North, 7 Broad St. TEL: (061) 797 5764
OLDHAM Home & Business Computers Ltd., 54 Yorkshire St. TEL: (061) 633 1608
PRESTON Wilding's 49 Fishergate. TEL: (0772) 556250
ROCHDALE Home & Business Computers, 75 Yorkshire St. TEL: TBA

LEICESTERSHIRE

LEICESTER Youngs, 40/42 Belvoir St. TEL: (0533) 544774
MARKET HARBOUROUGH Harborough Home Computers, 7 Church St. TEL: (0858) 63056

LINCOLNSHIRE

GRANTHAM Oakleaf Computers Ltd., 121 Dudley Rd. TEL: (0476) 76994/70281
LINCOLN MKD Computers, 24 Newlands. TEL: (0522) 25907

LONDON

E6 Percivals, 85 High St. North, East Ham. TEL: (01) 472 8941
E8 McGowans, 244 Graham Rd., Hackney. TEL: (01) 533 0935
EC2 Devon Computer Centre, 155 Moorgate. TEL: (01) 638 3339/1830
N14 Youngs Electronic t/a Fieldmaster, 19 The Broadway, The Bourne, Southgate. TEL: (01) 882 5579
N20 Castlehurst Ltd., 1291 High Rd. TEL: (01) 446 2280
NW4 DA Vinci Computer Store, 112 Brent St. Hendon. TEL: (01) 202 2272/3/4 (Just Opening)
NW9 Microscope, 459 Kingsbury Rd. TEL: (01) 204 6352
SE1 Vic Odden's, 6 London Bdg Walk. TEL: (01) 403 1988
SE9 Square-Deal, 375 Footscray Rd., New Eltham. TEL: (01) 859 1516
SE15 Castlehurst Ltd., 152 Rye Lane, Peckham. TEL: (01) 639 2205
SW6 Chelsea Micros Ltd., 14 Jerden Place. TEL: (01) 385 8494
W1 Devron 4 Edgware Rd. TEL: (01) 724 2373
W1 Computers of Wigmore Street, 87 Wigmore St. TEL: (01) 486 0373
W1 Sonic Foto & Micro Center, 256 Tottenham Court Rd. TEL: (01) 580 5826
W3 Colormatic Computers, 44 High St., Acton. TEL: (01) 992 7611
W11 Electrolease, 120 Notting Hill Gate. TEL: (01) 221 7029

MANCHESTER GREATER

MANCHESTER Lomax Ltd., 8 Exchange St., St. Ann's Sq. TEL: (061) 832 6167
SWINTON Mr. Micro Ltd., 69 Partington Lane. TEL: (061) 7282282
 Open Friday until 8 p.m.
HYDE Pace, 213-215 Market St. TEL: (061) 366 5935
BOLTON Wilding Ltd., 23 Deansgate. TEL: (0204) 33512
ECCLES Home & Business Computers, 4 Northway, Eccles Precinct. TEL: (061) 707 2004
WIGAN Wilding Ltd., 11 Mesnes St. TEL: (0942) 44382

MERSEYSIDE

HESWALL Thornguard Computer Systems, 46 Pensby Rd. TEL: (051) 342 7516
LIVERPOOL Beaver Radio, 20-22 Whitechapple. TEL: (051) 709 9898
LIVERPOOL (Aintree) Hargreaves, 31/37 Warbeck Moor. TEL: (051) 525 1782
SOUTHPORT Central Computers, 575 Lord St. TEL: (0704) 31881
WIDNES Computer City, 78 Victoria Rd. TEL: (051) 420 3333

MIDDLESEX

EDGWARE Breaker 1-4, 130 High St. TEL: (01) 952 7488/8860
HARROW Camera Arts (Micro Computer Division), 24 St. Ann's Rd. TEL: (01) 427 5469
HAYES Chipstop, 1000 Uxbridge Rd. TEL: (01) 573 2511 (Just Opening)
TEDDINGTON Teddington Camera Centre, Broad St. TEL: (01) 977 4716

NORFOLK

NORWICH Sound Marketing, 52 St. Benedict's St. TEL: (0603) 667725

GT. YARMOUTH Tony Hood Electronic, 26a Market Gate Shopping Centre. TEL: (0493) 3143

THETFORD Thetford C B & Micros, 21 Guildhall St. TEL: (0842) 61645

NORTHANTS

NORTHAMPTON Basic Computers & Systems Ltd., 72 Kingsthorpe Hollow. TEL: (0604) 710740

NOTTINGHAMSHIRE

NOTTINGHAM Cameo Computers, 8/9/10 Trinity Walk. TEL: (0602) 42912
NOTTINGHAM Basic, 39-41 Trent Boulevard, West Bridgford. TEL: (0602) 819713

NORTHERN IRELAND

BELFAST Arthur Hobson Ltd., 37 Gt. Victoria St. TEL: (0232) 246336
LONDONDERRY Foyle Computer Systems, 3 Bishop St. TEL: (0504) 68337
OXFORDSHIRE

SCOTLAND

DUMFRIES Vennals, 71 English St. TEL: (0387) 4547
EDINBURGH The Silicon Centre, 6-7 Antigua St. TEL: (031) 557 4546
GLASGOW Victor Morris Ltd., 340 Argyle St. TEL: (041) 221 8958
HAMILTON Tom Dickson Computers, 8-12 Cadzow St. TEL: (0698) 283193
KILMARNOCK Vennals, 49 Foregate. TEL: (0563) 32175
KIRKCALDY Kirkcaldy Photographic Services, 254E High St. File. TEL: (0592) 204734
PETERHEAD North East Computers, 1-3 Ellis St. TEL: (0779) 79900
STIRLING R. Kilpatrick, 58 Port St. TEL: (0786) 5532

SHROPSHIRE

SHREWSBURY Computerama, 13 Castlegate. TEL: TBA

SOMERSET

TAUNTON Grays, 1 St. James St. TEL: (0823) 72986

STAFFORDSHIRE

STAFFORD Computerama, 59 Foregate St. TEL: (0785) 41899
STOKE-ON-TRENT Computerama, 11 Market Sq., Arcade, Hanley. TEL: (0782) 268620

SUFFOLK

BURY ST. EDMUNDS Bury Computer Centre, 11 Guildhall St. TEL: (0284) 705772
IPSWICH Brainwave, 24 Crown St. TEL: (0473) 50965
LOWESTOFT John Wells, 44 London Rd., North. TEL: (0502) 3742

SURREY

CAMBERLEY Camera Arts (Micro Computer Division), 36 High St. TEL: (0276) 65848
CHERTSEY Chertsey Computer Centre, 1 Windsor St. TEL: (09328) 64663
CROYDON Cadcom Ltd., 96 Whitgift Centre (Next door to MacDonald's) TEL: (01) 686 8393
GUILDFORD The Model Shop, 23 Swan Lane. TEL: (07772) 0483 39115
HASLEMERE Haslemere Computers, 25 Junction Place, adj. Rex Cinema. TEL: (0428) 54428
NEW MALDEN Surrey Micro Systems, 31 High St. TEL: (01) 942 0478
WALLINGTON Surrey Micro Systems Ltd., 53 Woodcote Rd. TEL: (01) 647 5636
WOKING Harpers, 71/73 Commercial Way. TEL: (04862) 61061

SUSSEX

BRIGHTON Capricorn, 1 Queens Rd. TEL: (0273) 29634
LITTLEHAMPTON Alan Chase Ltd., 39 High St. TEL: (09064) 5674/4545

TYNE & WEAR

NEWCASTLE-ON-TYNE Newcastle Camera & Computer Mart, 16 Northumberland Ct. TEL: (0632) 327461

WALES

ABERYSTWYTH AberData at Galloways, 23 Pier St. TEL: (0970) 615522
CARDIFF Randall Cox, 18/22 High St. Arcade. TEL: (0222) 31960
NEWPORT (Gwent) Randall Cox, 118 Commercial St. TEL: (0633) 67378
PEMBROKE Randall Cox, 19 Main St. TEL: (064) 668 2876
PORT TALBOT Micro Gen, 6 Royal Buildings, Talbot Rd. TEL: (0639) 887730
WREXHAM T E Roberts, 26 King St. TEL: (0978) 364404/364527

WARWICKSHIRE

LEAMINGTON SPA IC Computers, 43 Russell St. TEL: (0926) 36244 (Opening Soon)
RUGBY The Rugby Micro Centre, 9-11 Regent St. TEL: (0788) 70522

WEST MIDLANDS

BIRMINGHAM Sherwoods, Gt. Western Arcade. TEL: (021) 236 7211
COVENTRY Coventry Micro Centre, 33 Far Gosford St. TEL: (0203) 58942
DUDLEY Central Computer Services, 35 Churchill Precinct. TEL: TBA
WEST BROMWICH Bell & Jones, 39 Queens Sq. TEL: (021) 553 0820

WORCESTER

WORCESTER David Waring Ltd., 11 Marmion House, High St. TEL: (0905) 27551

YORKSHIRE

BRADFORD Erricks Foto-Sonic House, Rawson Sq. TEL: (0274) 309266
HULL The Computer Centre (Humburside) Ltd., 26 Anlaby Rd. TEL: (0482) 26297
LEEDS Bass & Bligh, 4 Lower Briggate. TEL: (0532) 454451
SHEFFIELD Superior Systems Ltd., 178 West St. TEL: (0742) 755005
SKIPTON Look & See, 45 Belmont Bridge. TEL: 0756 60078
YORK York Computer Centre, 7 Stonegate Arcade. TEL: (0904) 641862

NEW SPECTRUM MEMBERS

Check your area there are many new SPECTRUM dealers throughout the U.K. So there's a good chance there'll be a SPECTRUM centre near you!

48K SPECTRUM



W A L K

“VALHALLA is an animated graphics adventure whose undisguised intention is to steal the title of "best micro adventure game bar none" from THE HOBBIT.

The 48K program uses a new operating system MOVISOFT and boasts a number of HOBBIT-like features. There are 20 significant characters, each with their own aims and objectives.

You are a minor God set the task of recovering Odin's Golden Helmet. To complete this

you will also have to master three lesser tasks, one of which is to rescue IDUN, a maiden responsible for the Golden Apples which keep the Gods youthful.

The games' designer, LEGEND, claims that the program involves a sophisticated degree of interaction. For example, should an enemy overhear you telling a friend some important information, he will try to ruin your plans.

LEGEND stresses that the personality of each of the characters is genuinely independent "as opposed to pseudo independent behaviour

like Thorin sitting down and singing about gold or Gandalf walking off with your door for no reason".

The moving graphics are reportedly of cartoon quality, with both background and foreground movement illustrating the events of the plot.

Pretty impressive claims.

HOBBIT fans will no doubt feel both intrigued and sceptical..

Watch this space.”

...Graham Taylor,
Software Editor,
POPULAR COMPUTING WEEKLY -26th MAY'83

MOVI
SOFT

● UK Release August 15th.



LEGEND

VALHALLA

What is the difference between a bit and a byte?

Andrew Hewson considers the basics of machine code

HAVING RECEIVED a number of letters asking about the fundamental ideas of machine code programming, I have devoted most of the column to the topic. John Stevens of Hammersmith, London writes:

I am trying to learn how to write machine code programs but I am finding it difficult to understand the meaning of some of the words which are used. Can you explain as fully as possible what is the difference between a bit and a byte, and between a register and a variable?

A bit is the fundamental building block of computer memory and can exist in only one of two states. The two states can be thought of as representing ON or OFF; TRUE or FALSE; YES or NO; UP or DOWN; MALE or FEMALE or any other pair of logically opposite conditions. The mechanism by which a computer memory works is not really important to us but in the Sinclair computers the state of a bit is memorised by setting a microscopic solid state switch either ON or OFF as appropriate.

The usual notation is to think of one state as the ZERO state and the other as the ONE state. A bit is considered to be set when it is in the state representing ONE and to be re-set otherwise. That notation allows us to speak of a given pattern of bits in terms of its binary equivalent and by converting the binary number to a decimal; each bit pattern can be given an exceptional positive integer decimal number.

For example, consider eight bits of which the right-most four are set and the left-most four are re-set as illustrated in table one. The binary pattern of the eight bits can be converted to a decimal if it is remembered that, in a binary number, the right-most column is the units column; the next column to the left is the twos column; the next to the left again is the fours column and so on, doubling at each move to the left. The decimal equivalent of 00001111 is therefore:

$$0*128+0*64+0*32+0*16+1*8+1*4+1*2+1*1=15$$



● Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.

Obviously it is inconvenient to refer to bits as the right-most or the third from the right and so the convention is adopted of numbering the bits from the right, starting at zero as shown in table one. When that convention is used the number of each bit is also the power to which 2 must be raised to give the value of the column. That is:

$$2^{\text{bit number}} = \text{column value}$$

Bit 3, for example, is in the eights column because $2^3=8$.

I chose to consider a group of eight bits together because the Z-80A microprocessor at the heart of the Sinclair computers is designed to operate on eight bits at a time. The term operates

covers all the types of task which the Z-80A can perform directly such as addition, subtraction, rotation, logical AND, and the like. Thus although a bit is the fundamental unit of computer memory, bits are usually manipulated together in groups of eight, so a group of eight bits is called a byte — pronounced bite.

There are 256 ways of arranging the contents of a group of eight bits. The first is 00000000, the second is 00000001, the third is 00000010. Thus each of the bytes in RAM can be used to hold a single positive whole number lying between 0 and 255 inclusive by setting or re-setting the eight bits in the byte according to the binary equivalent of the number.

The Z-80A does not alter the contents of memory directly when it is executing a program; rather it copies the contents of a location in memory into one of several special locations in the microprocessor called a register and then operates on the contents of the register. The Z-80A is a powerful microprocessor because it has many registers and so it can hold several numbers at once, thereby reducing the need to make time-consuming transfers between the processor and memory.

Most of the registers have one or more special features. The most important one is the 'a' register or accumulator, so-called because the results of most

Switch setting	Off	Off	Off	Off	On	On	On	On
State	Re-set	Re-set	Re-set	Re-set	Set	Set	Set	Set
Binary pattern	0	0	0	0	1	1	1	1
Bit number	7	6	5	4	3	2	1	0

Table 1. Three ways of representing a group of eight bits of which the four left-most are re-set and the four right-most are set. The bit number is shown on the bottom line.

```

10  FOR I=23296 TO 23325
20  INPUT Z$
30  IF Z$="S" THEN STOP
40  PRINT Z$;" ";
50  LET Z$(1)=CHR$(CODE Z$(1)-7*(CODE Z$(1) 57))
60  LET Z$(2)=CHR$(CODE Z$(2)-7*(CODE Z$(2) 57))
70  POKE I,16*CODE Z$(1)+CODE Z$(2)-816
80  NEXT I

```

Table 3. A Spectrum program to load 30 two-character hexadecimal codes into the printer buffer.

arithmetic or logical instructions are accumulated in the 'a' register. Some instructions use a second register as a second source of data together with the 'a' register.

For example the instruction:

add a,b

means add the contents of the 'a' register to the contents of the 'b' register and leave the result in 'a'.

Thus a register is a dedicated location in the microprocessor which has specific attributes and functions. A variable is a location or group of locations in RAM which are used by a particular program. If the program is written in Basic or another high-level language, the variable is given a name and all references to the variable are made using the name.

The next question, from Alan Birmingham of London, follows from the previous one. He asks:

What do the following programs do—an assembler, a disassembler, an interpreter, a compiler?

A machine code routine consists of a sequence of instructions which the Z-80A understands directly with no need for prior interpretation. The simpler instructions are held in one byte of memory but the more complicated instructions can occupy as many as four bytes.

Generally, the instructions are executed in the order in which they are encountered, although there are exceptions. The Z-80A keeps a note of from where the next instruction is to come by means of a special register pair called the program counter. Thus if the location pointed to by the program counter contains the number 128 in decimal — 80 in hexadecimal — the Z-80A will add the contents of the 'a' register to the contents of the 'b' register and leave the result in the accumulator, because 128 is the decimal machine code instruction for

add a,b

The decimal or hexadecimal codes for all the 600 or so instructions in the Z-80A instruction set are difficult to remember and so for that and other reasons machine code programs are almost always written using an assembler program. An assembler converts instructions like add a,b to the correct code. It also allows the programmer to name variables, add comments and give labels to various points in the program and to call subroutines using the labels. A good assembler will have other facilities as well, all aimed at making the programmer's job as straightforward as possible.

A disassembler performs the opposite function to an assembler; it converts a sequence of numbers into a sequence of mnemonics which are easier to understand than the original code. A list of the more important mnemonics is given in the Sinclair manuals in Appendix A. A disassembler is of use when analysing code written by somebody else to discover how it works.

The output from an assembler is a program which the microprocessor can understand directly because it consists of machine code instructions. In contrast, a program written using an interpreter, such as Sinclair Basic, is held in RAM in more or less the form in which it was entered by the programmer.

Interpreters are high-level languages which bear little or no relationship to the instruction set of the processor on

'A disassembler is of use when analysing code'

which they are run. Every time the program is executed, however, each line must be analysed by the processor before the required action can be taken. The principal disadvantage of the system is that the programs can be slow to execute, because the processor spends most of its time determining what each program line means.

A compiler circumvents the problem by analysing each program line once only and then storing a sequence of machine code instructions which are equivalent to the original program. Thus the speed of a machine code

program is obtained without losing the convenience of a high-level language. The machine code produced by a compiler can be somewhat tortuous and inflexible and so when efficiency is essential an assembler is used instead.

Robert King of London asks: **I have a program which works well on my friend's Spectrum but always crashes on mine. I suspect a fault in the RAM. Have you a program which checks each RAM location in turn?**

Checking RAM involves setting every bit of every byte, checking that it remains set, and then re-setting every bit and checking that it then remains reset. Setting every bit in a byte is equivalent to POKEing 255 into that byte. Similarly, re-setting every bit is equivalent to POKEing in 0.

Obviously it is not possible to POKE numbers into every memory location while the machine is running, because the computer will crash, but a partial check can be made by testing every location in the spare area of memory.

The program in table two runs such a check. It can be loaded using an assembler or using the simple hexadecimal loader listed in table three. The program checks every location up to the bottom of the stack and returns the address at which it stops — about 32575 in the 16K machines and 65343 in the 48K machine when they are working correctly.

Finally, I must apologise for an error in the Kaleidoscope program which appeared in the June issue. Line 100 should read:

100 POKE S+32-31*I+32*J,K

My thanks to all those who pointed-out the error.

Hex code	Assembler code	Comment
2A 65 5C	LD HL, (23653)	Set HL to address of spare space
44	LD B,H	Copy HL
4D	LD C,L	to BC
3E 00	LD A,O	Set A to 0
77	LD (HL),A	Copy A to memory
7E	LD A, (HL)	Copy memory back to A
FE 00	CP 0	Compare result
CO	RET NZ	Return if error
3E FF	LD A,255	Set A to 255
77	LD (HL),A	Copy A to memory
7E	LD A,(HL)	Copy memory back to A
FE FF	CP 255	Compare result
CO	RET NZ	Return if error
A7	AND A	Clear carry flag
23	INC HL	Increment HL
ED 72	SBC HL,SP	Subtract stack pointer from HL
C8	RET Z	Return if finished
A7	AND A	Clear carry flag
ED 7A	ADC HL,SP	Add stack pointer to HL
03	INC BC	Increment BC
18 E7	JR -25	Repeat for next memory location

Table 2. A Spectrum machine code program to test each memory location between the beginning of the spare space—marked by the STKEND system variable—and the bottom of the stack.

The Challenge of the Decade! With NEW Games like **CONFLICT** and **GALAXY CONFLICT**

We're adding the latest and best to our catalogue every month from selected sources throughout the UK and North America — so there's a new challenge for you **every time** at prices you won't beat!

Remember — we specialise in programs for your Sinclair — whether you choose games, business, educational or household software. Many of our games cannot be bought by mail order from any other source. And many of our prices are the lowest you'll find **anywhere**. You'll want to make **sure** victory is yours with these new programs where **two can play**:

CONFLICT — Total war for two players, involving both the machinery (armies, missiles, warships) and finance (stock market, oil, piracy) of conflict.

To order quote the following references: — ZX81-16k: C-1; Spectrum-48k: C-2.

GALAXY CONFLICT — Raise the fleet of battle Eoncruisers then move from bridge to bridge taking full control and responsibility in this battle for the heavens — to prove yourself a born galactic ruler!

To order quote the following references: ZX81-16k: GC-1; Spectrum-48k: GC-2.

Each comes complete with game board, program, counters, markers, maps (**CONFLICT** only) plus full instructions and rules of war for the **unbeatable introductory price of £9.95!**

(N.B. When ordering be sure to specify the correct order number, dependent upon the type of machine — ZX81 or Spectrum — that you own.)

With our Special deal you can't go wrong:

- ★ **FREE** offer every time (this time it's a free blank C20 cassette with every two programs ordered)
- ★ A replacement guarantee if you're not entirely satisfied with the quality of your purchase — that's how confident we are!

All you have to do is look at our new **HOT** selection — then order quickly to benefit from the introductory prices of our new games of skill, intelligence and excitement (fast delivery is another of our specialities — so you could be using these new programs **SOON**)

FREE BLANK C20 COMPUTER CASSETTE WITH EVERY TWO CASSETTES YOU ORDER!

Remember there's no limit to the number of free cassettes you receive if your order justifies them — so why not get together with friends or user group members and share the freebies?

GUARANTEE

Order with complete confidence. If you are not entirely satisfied with the quality of your purchase — return it to us within 7 days and we will provide a replacement



GREAT VALUE! TREMENDOUS SELECTION! PLUS A FREE OFFER EVERY TIME!

Fill in the order form right away — we're guaranteeing fast delivery, quality and satisfaction (after all, we want you to come back for more!)

**The Software Workshop, Yew Tree, Selborne,
Hants GU34 3JP**

GALAXY CONFLICT

(ZX81/Spectrum)

Exciting and Challenging Computer Game For Two Players

Use a fleet of battle Eoncruisers, then move from bridge to bridge taking full control and responsibility in this battle for the heavens. Born galactic rulers will do well.

CONFLICT

(ZX81/Spectrum)

At last — an Exciting and Challenging Computer Game!

A total war for two players involving both the machinery and finance.

Here's a whole NEW selection of the latest games, the best-value software for your ZX-81 or Spectrum.

ZX81 Software

- 1-01 Stock Market**
Buy and sell your way to millions! 16K RAM
- 1-02 Football League**
First division fun for the soccer enthusiast. 16K RAM
- 1-03 Test Match**
Match your wits alongside the superstars. 16K RAM
- 1-11 Arcade Action**
Overtaker/Missile Man/Space Fighter/Pilot/Greedy Gobbler/Extra Terrestrial. 1K
- 1-12 Avenger**
Avoid missiles and bombs to become the ruler. 16K RAM
- 1-13 Protector**
Defend your own ship from oncoming attackers. 16K RAM
- 1-21 Football Manager**
Manage your team through a hectic league season! 16K RAM

£3.95

£3.95

£3.95

£4.95

£4.95

£4.95

£5.95

2-14 Meteor Storm
Spectrum version of the ever-popular arcade game. 16K or 48K RAM **£4.95**

2-15 Star Trek
Popular space program brought to life by excellent graphics. 48K RAM **£4.95**

2-21 Frogger
Manoeuvre the frog across the road avoiding heavy traffic. 48K RAM **£5.95**

2-22 Crazy Balloons
Guide the balloons round the maze without bursting. 48K RAM **£5.95**

2-23 Arcadia
The expert's version of the popular 'Invaders' game. 16K or 48K RAM **£5.95**

2-24 Golf
The finest of golf handicap games. 48K RAM **£5.95**

2-25 Test Match
More exciting than the real thing! 48K RAM **£5.95**

2-26 Derby Day
This favourite has to be a winner. 48K RAM **£5.95**

2-27 Rescue
Rescue the Princess from marauding patrols. 48K RAM **£5.95**

2-28 The Orb
Discover the Orb in the depths of the temple but watch the monsters. 48K RAM **£5.95**

2-29 Jackpot
The harmless way to take on the one-armed bandit. 48K RAM **£5.95**

2-31 Football Manager
See 1-21 under ZX81. 48K RAM **£6.95**

Spectrum Software

- 2-12 Avenger**
[See 1-12 under ZX81]. 48K RAM
- 2-13 Sentinel**
Guard your mother ship against alien attacks. 48K RAM

£4.95

£4.95

To: The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

I wish to order the following programs. I understand that:

- * I will receive a FREE blank cassette with every 2 programs ordered
- * I can return products within seven days if not entirely satisfied and receive a replacement.

Ref No	Qty	Title	Price

Postage, packing and handling: add 45p for the first cassette, and 25p for each additional cassette. Non-UK orders add extra 50 %

Total

I enclose a cheque/postal order for _____

Name _____

Address _____

SUS

(Allow 28 days MAXIMUM FOR DELIVERY)

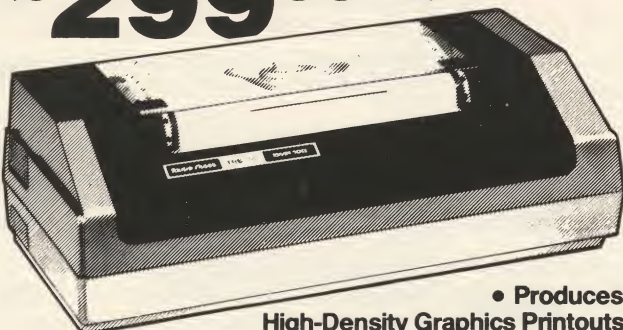


Save £2 on normal price!

OFFER CLOSES 31/18/83

Tandy® TRS-80 Low-Cost Dot Matrix Printer With Graphics

£299⁰⁰ Inc. VAT



• Produces
High-Density Graphics Printouts

DMP-100. Prints 5 x 7 dot-matrix upper and lower case characters on an 8" line as well as high-density graphic information or standard 10 cpi alphanumerics. Features 480-byte full-line dot-buffer, selectable parallel and serial interfaces (600/1200 Baud) and adjustable tractor, 4 1/2 to 9 1/2". Uses fanfold paper. With ribbon cassette. 26-1253

Tandy® The Biggest Name in Little Computers

See Our Extensive Range of Microcomputer Accessories
At Any One of the 340 Tandy Stores Nationwide!

SOFTWARE WRITERS

If you write programs for the Spectrum or ZX81, are you being paid what you are worth?

Having written a program which you think has potential, what then? Send it to a software house and hope they are honest? Market it yourself and risk thousands of pounds? Put it away in a drawer?

We are a professional marketing company, interested only in obtaining the highest rewards for software writers. We are not connected with any hardware or software manufacturers and deal with writers in total honesty. Most importantly, we can secure deals for them, worldwide, which are way ahead of anything they could negotiate themselves.

If you have written a program, for any Sinclair computer, which you think could be commercial, send it to us on tape for evaluation. We will advise you, free and without the slightest obligation, on the commercial prospects for your program.

NEIL GIBSON & COMPANY

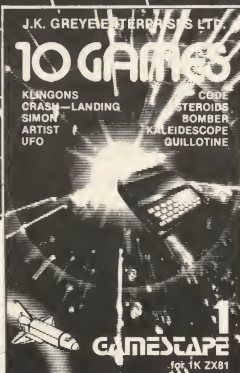
Neil Gibson & Co.,
42, Abbeygate Street,
Bury St. Edmunds,
Suffolk

J. K. GREYE ENTERPRISES LTD



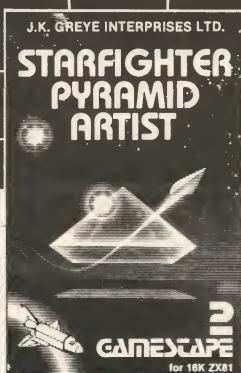
THE ARCADIAN
16/48K SPECTRUM
includes games to suit all ages, from 5 to 105
INVASION: Our version of the Classic Arcade Game, surely one of the best around. Includes Full Colour High Res. Graphics, Sound and it's incredibly fast at the end.
KAMIKAZE: If you like Scramble, you'll love this. 16 levels (long ones at that), of tortuously twisting caverns, Missiles, Starmines (which move in between games, so it's never the same next time around), Bases, Fuel Dumps (watch you don't run out of fuel!), and two speeds (difficult and impossible). Definitely a game for those amongst you with a suicidal tendency, when playing games, because you can score even when you crash! (If you can make it past level 8, write and let us know, 'cause that's as far as we've managed!).
MINELAND: A totally new game, in which you have to lay mines in a forest. Sounds simple doesn't it? But, once you start, you can't stop and there lies the rub (or to be more exact the explosion!). Guaranteed to get your fingers in a twist!
UFO: Dodge the Asteroids, blast the Alien Craft and work off your aggressive instincts on the keyboard. Gets progressively more difficult the longer you last!
All of these for only **£4.95**

**TRADE & EXPORT
ENQUIRIES
WELCOME**



GAMESTAPE 1
1K ZX81
10 Games incl. ASTEROIDS, UFO, CODE, BOMBER, GUILLOTINE, KALIEDESCOPE, etc.
PROBABLY THE BEST VALUE 1K TAPE AVAILABLE.
We've done it! 1k games which some of our competitors require 16k to do!

only **£3.95**



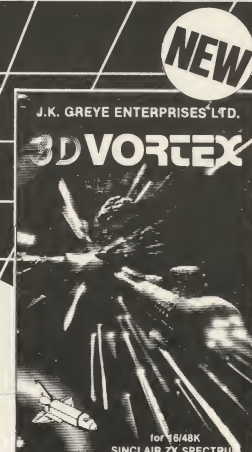
GAMESTAPE 2
16K ZX81
*STARFIGHTER Superb machine code Space Battle, set against a background of twinkling stars, with stunning explosions... if you can hit the enemy!
PYRAMID Can you move the Pyramid? Make a mistake and it will collapse! A thinkers game.
ARTIST The ultimate Graphic Designers and 8 Directions, 10 Memories, SAVE, COPY, RUBOUT, CLS, etc.

only **£3.95**



GAMESTAPE 3
16K ZX81
*CATACOMBS A Multi-Level Graphics Adventure. Each level can contain up to 9 Rooms, 8 Passages, 7 Monsters, Food, Gold, Traps, Phenoms, an Exit (to the next level), and there's an infinite number of levels.
NOTE... This is NOT one of the necessarily limited test Adventures as sold elsewhere.
"An excellent addictive game which will keep you amused for hours"....COMPUTERS & VIDEO GAMES

only **£4.95**



3D VORTEX
16/48K SPECTRUM
After a successful warp transfer, you drop your craft below light speed, only to discover you are caught in the irresistible gravity well of a giant Neutron Star. You are dragged past the Event Horizon, and then the fun really begins! Gravitic Tidal pressures have created a mind boggling Vortex through the tortured supra-matter of the Neutron Star. And guess who's caught in it? The onboard Navigational Computer copes for a while, but what mere machine can withstand the awesome forces inherent in such an anomaly. Soon the Nav.Com. will cease functioning, and then (of course), it's all down to you.
Are you capable of "seat of the pants" flying, it won't be easy? Not only does the Vortex twist and turn, like some demented worm, but your Tau-Sigma Shield will only withstand 10 contacts with the boundary layer. And, as if that wasn't enough, you have to dodge, or laser, the Octoplasms, Droids and Sirius Class Battlestars. Best of luck! You'll need it!
Features:
Stunning 3D Graphics.
Full Sound Effects.
High Speed Machine Code Animation.
Full Instructions.
Choose your own Control Keys.
Compatible with most Joysticks.

only
£5.95

SOFTWARE SUCH AS DREAMS ARE MADE OF

Send your order to:
J.K. GREYE ENTERPRISES LTD.
16 Park St. Bath BA1 2TE

Name
Address
..... Postcode

I enclose a cheque/p.o. for £.....
made payable to J.K. GREYE ENTERPRISES LTD.

All software sold subject to the condition that
Hiring, Lending, Unauthorised copying or
Resale is Strictly Prohibited.

If you prefer to see before buying,
our range of Gamesapes are stocked by
W.H. Smith, John Menzies and
good computer stores Nationwide.

Now you can take a new

AMERICAN look at your Sinclair!

With the new Timex Sinclair User magazine to link YOU into a huge network of American enthusiasts

The success of the Sinclair ZX80, ZX81 and Spectrum in the U.K. has been phenomenal. But in the States the Sinclair has been given a real American welcome — making the Sinclair range the biggest seller in the world! The American ZX81 equivalent: "The Timex Sinclair 1000" from the giant Timex organisation, has been bought by hundreds of thousands of enthusiasts.

The success of 'Sinclair User' magazine in the U.K. followed a similar pattern — so now we're matching the U.S.A. enthusiasm with a brand new U.S.A. magazine — the *Timex Sinclair User*!

The first issue will be published in the U.S.A. in May — packed with news, reviews, programs and User Club information to link you into the vast American Timex Sinclair user network.

Remember, this is a new magazine written from the American viewpoint — but it could open up whole new horizons for you on your Sinclair enjoyment. Take the new, American view by ordering right away and see how the U.S.A. welcomed the Sinclair!

Annual subscription rate is £20. Single copies are £2.00 each (including P & P).

Fill in the order form NOW to get the first issues of this exciting new magazine.

Send to: **TIMEX SINCLAIR USER, ECC Publications Ltd.,**
30-31 Islington Green, London N1 8BJ

Yes, I want to subscribe to **TIMEX SINCLAIR USER** at the special U.K. rate of £20 for 12 issues delivered to my door.

Name _____

Address _____

I enclose a cheque/P.O. for £ _____

Please charge my credit card

Card Name _____ Card Number _____

Signature _____ Date _____

N.B. This offer applies to UK subscribers only. Overseas rates available on request.

N.B. Subscribers to Sinclair User, Sinclair Programs or Sinclair Projects should be aware that Timex Sinclair User will occasionally reproduce top articles that have previously appeared in our U.K. magazines.

**timex
sinclair
user**

Q QUEST Q

MICROSOFTWARE

: VIOLENT UNIVERSE :

the battle could be yours...
...but it won't be easy!

Totally original game plan. Addictive, challenging and offering a complete visual experience with its animated graphics and violent explosive effects. Compatible with ALL leading joysticks.

**available NOW FROM
YOUR LOCAL SOFTWARE RETAILER**

£5.50 or direct from ^{any} **Spectrum**

QUEST MICROSOFTWARE, 119 THE PROMENADE,
CHELTENHAM, GLOS. GL50 1NW

ring 0242-583661

Q QUEST... Q
...SIMPLY THE BEST

THE TOMB OF DRACULA!



3D HORROR ADVENTURE GAME!

For the **16K ZX81** or with colour and sound for the **48K SPECTRUM**, a superb 3D graphics adventure game! Enter Dracula's tomb at 30 minutes to sunset . . . wander through the tomb's pre-mapped 300 vaults in search of the fabled Vampire's Treasure . . . **pick up** valuable silver stakes and use them to defend yourself against the lurking horrors . . . ghouls, zombies, pits of primaeval slime . . . **See** them all on the computer's plan of the tomb . . . when it will let you! **Take** a chance on a Mystery Vault . . . if you dare! And all the time the minutes are ticking by to sunset . . . when **Dracula** rises from his coffin and comes after **you!** Each of the infinite levels of the tomb has its own 300 vaults . . . go as deep as you like, the Prince of Darkness will seek you out in his blood-lust! **WARNING: people of an exceptionally nervous disposition should play this game only during the hours of daylight!** Special facility lets you save a game in progress onto tape so you can continue it whenever you choose.

For ZX81 with 16K RAM £3.95
For 48K SPECTRUM £4.95

Price includes ready-to-load cassette with library case and inlay, full instructions, postage and packing. **Order today!** Money refunded if not delighted!

Send cash, P.O. or cheque to:

FELIX SOFTWARE (DEPT. SU12)

19 Leighton Avenue, Pinner, HA5 3BW.

BARGAIN-HUNTERS READ THIS!

Whatever your model of Sinclair computer—you can get HOURS of fun, intellectual satisfaction and education for just 95p per month!

A bargain?

That's **Sinclair Programs** magazine—the fat, glossy magazine that's **PACKED** with original, tested programs for you to load and run.

With **Sinclair Programs** every month you can build the library of programs that suits your mood: in recent issues we have challenged our readers with programs to test their skill at Sharpshooter or Laser Cannon . . . jolt their brain cells with Quadratic Equation or Monster Maths . . . or take a practical turn with their own word processor program or graphic generator.

That is just a fraction of what you get from **Sinclair Programs**. Each month we have 40 programs for owners of ZX80s, ZX81s and Spectrums. But make sure you don't have to hunt TOO far for your bargains—**Sinclair Programs** always sells out quickly, so order yours **TODAY** from your newsagent, or fill in the form below and we will send it direct to you, every month.



Mail to: ECC Publications Limited, 30-31 Islington Green, London N1 8BJ Yes — I'd like to subscribe to **Sinclair Programs** (12 issues — price £13.20) I enclose a cheque for £ _____ Please charge my _____

credit card Card: name _____ Number _____

Name _____ Address _____

Signature _____ Date _____

NB This offer applies to UK subscribers only. Overseas rates available on request.

Following his last article about The Hobbit, Quentin Heath has received many pleas for help. He makes his last visit to Middle Earth.

Goblins' Dungeon has claimed its last victim

THE HOBBIT has proved to be one of the most popular adventure games for the 48K Spectrum. It has been elevated to cult status by many readers of Mind Games who continually find themselves stuck in the Goblins' Dungeon or facing the Dragon without an arrow.

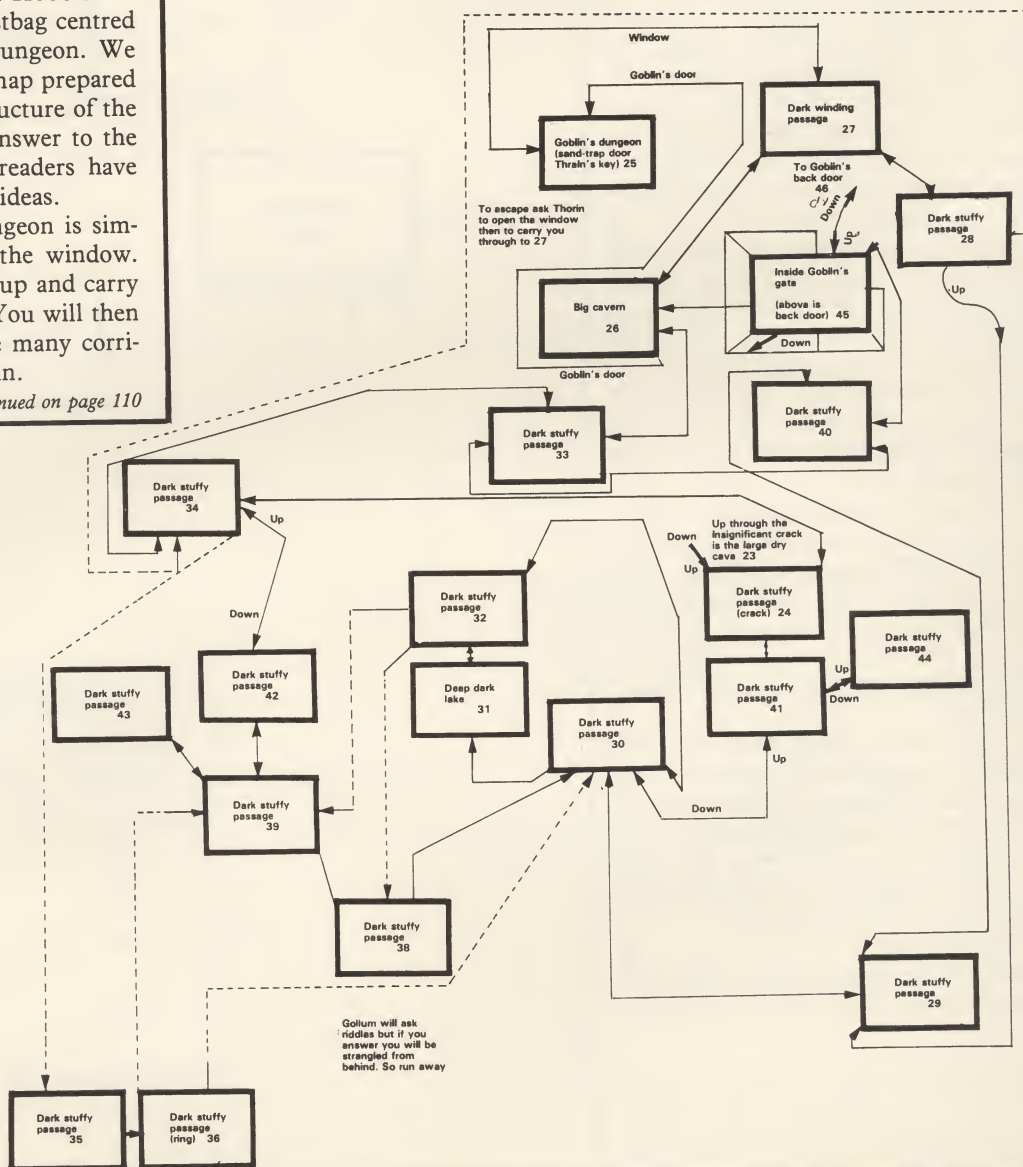
This month I am closing the file on The Hobbit by revealing some hints and tips which have never been published. I warn you to read on only if you want to know the secrets of Hobbit.

The questions in my postbag centred mainly on the Goblins' Dungeon. We have reproduced part of a map prepared by a reader to show the structure of the dungeon to give you the answer to the problem, to which many readers have written to contribute their ideas.

The way out of the dungeon is simple. Ask Thorin to open the window. Then ask him to pick you up and carry you through the window. You will then find yourself in one of the many corridors of the Goblins' domain.

continued on page 110

THE GOBLINS LAIR



continued from page 117

Some people have not tried to cross the river and doubled back to the forest gate. There is a boat hidden on the other side of the river and all you have to do is to throw the rope across, pull the boat through the water and climb into it.

You will then find yourself on the east bank and about to face those deadly spiders looking for a quick snack.

When you arrive at the first spiders' web you must break it with your hand. If you try to pierce it with your sword you will find yourself in trouble. Once you have broken the web you will be in the domain of the spiders. You can go east or north from there but if you want to survive you should take the latter option. If you go east you will finish in the deep bog.

The Elven King's Cellar is also a cause of difficulties. Some people find it difficult to get into the barrels to float in the river beneath the trap-door. It is best to have the ring in this situation. Wear it when the butler enters and eventually he will empty one of the barrels and leave off the lid. Get into the barrel and wait for the butler to push it into the river. You are then on your way to Lake Town and a battle with the dragon, Smaug.

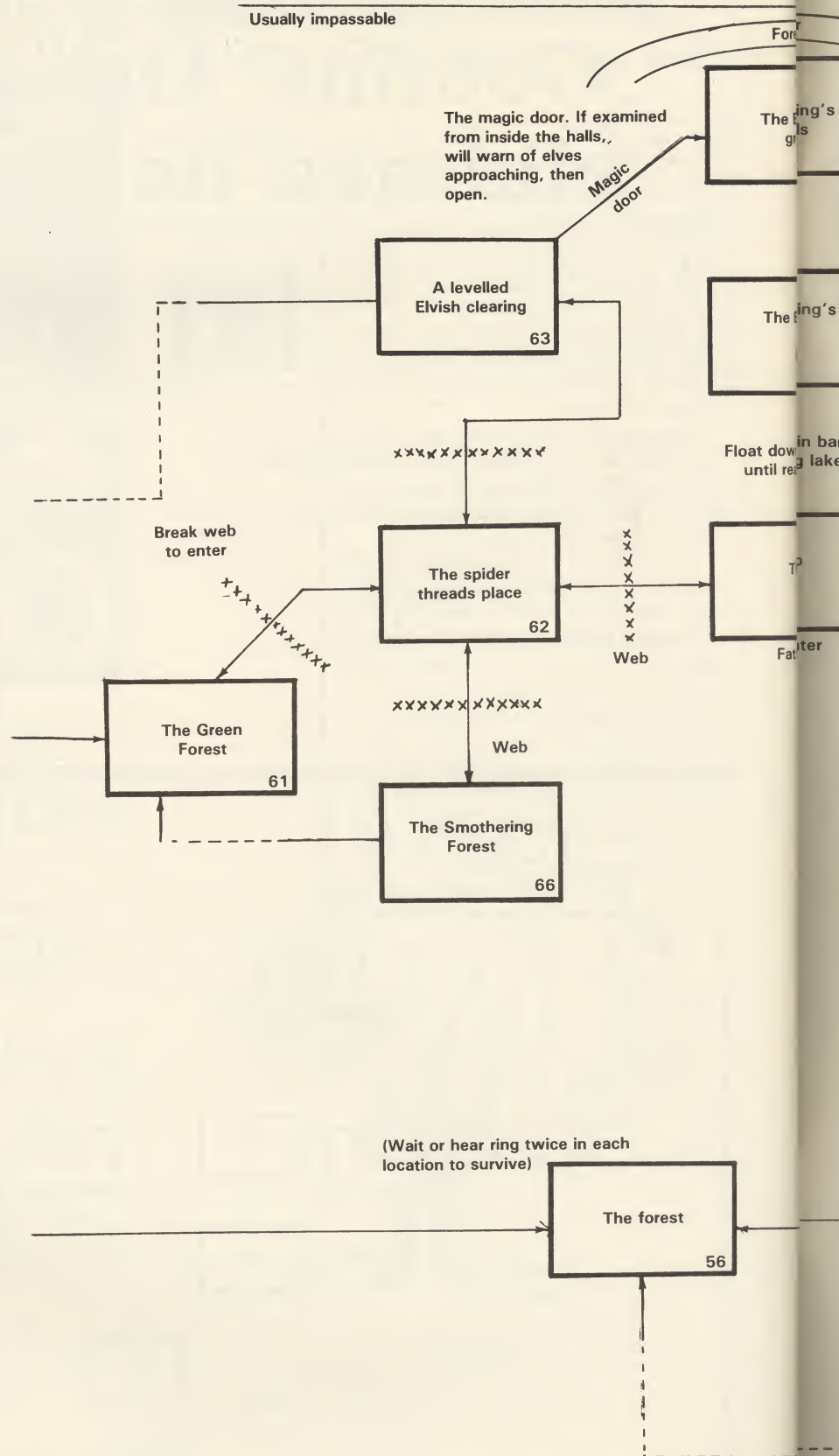
The scoring system in the game seems to be erratic and many people who have finished the adventure have complained that they have not scored 100 percent. That is not a fault of the program. Readers who have not scored 100 percent have not been to all the places and done all the things they should have done.

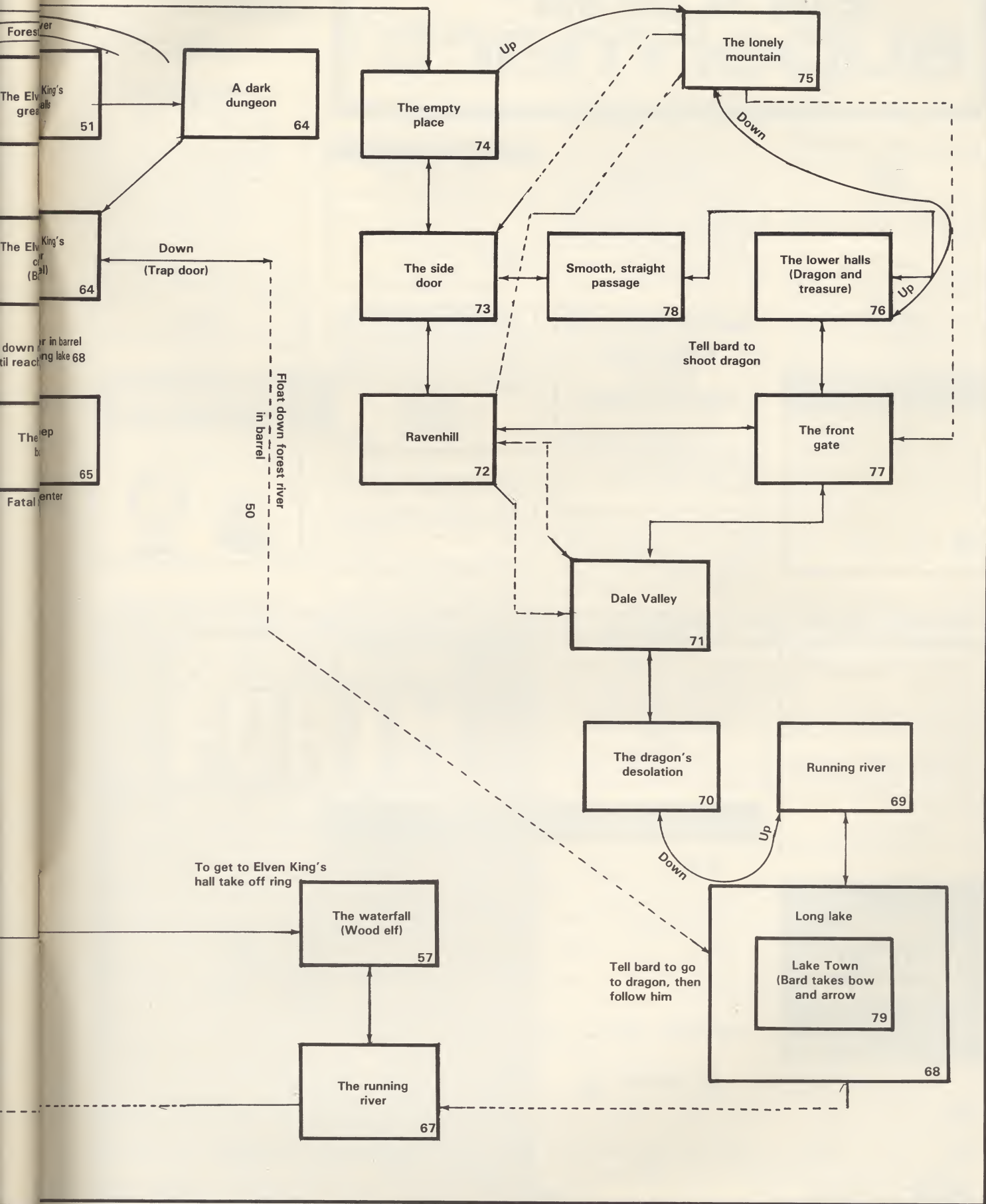
I would like to hear from anyone who has managed to score 100 percent as I am still trying to reach that magic number. I would, however, like to stress that I cannot deal personally with more letters on *The Hobbit*. I have given you sufficient information to get out of most difficulties.

Next month I shall deal with two graphics adventures. The first is a new game called **Halls of Things** and the other is **Black Crystal**, brought to you by popular demand. If you have any hints or problems with *Black Crystal* I would like to hear from you.

The map of *The Hobbit* was supplied by Stephen Hawkes whose 80 percent is one of the highest recorded.

● If you have any views on mind games or if you have hints and tips on adventure, computer-moderated games or chess, please write to me: Quentin Heath, Mind Games, c/o Sinclair User, ECC Publications, 30-31 Islington Green, London N1 8B7.





sinclair supermart

FOOTBALL POOLS PREDICTOR



For 16K ZX-81

3+3 methods of prediction. Enter matches played and draws. Program lists in order of preference. Works on British and Australian results only £4.95.

DATA FILE

Holds 80 entries per side. Address book and labelling options. Common lines facility. Printer option. Ideal for small business, clubs or home etc. 16K ZX-81 only £4.95.

Matrix Software,
36 Yardley Wood Road, Moseley,
Birmingham, B13 9JB.

ZX-81 (16K) MACHINE INTELLIGENCE

Program — "EIGHTS" — as featured in *Practical Computing* (Aug 1982, p77). The card game of strategy for two players, available now for the ZX-81. An addictive invitation to try and outwit your ZX-81 (16K). SAE for full description and details. Double-recorded on high quality cassette, and complete with full instructions. £4 (inc. 1st class post).
Cheque/PO/cash

HARDY SOFTWARE
18 Velindre Place,
Cardiff CF4 2AN.

COUNTEX FASCINATING GAME FOR PRE/PRIMARY SCHOOL AGES

A fun game for young children which holds their interest while stretching their abilities to identify and count objects, recognise colours, and do simple arithmetic.

Familiar shapes, animals, transport, objects found at home etc. animated in full colour with musical accompaniments.

Graded levels of difficulty with random questions to ensure every game is different and interesting.

The scoring system rewards the child by a man leaping across a water-filled pond. Only a perfect score enables him to reach the other side and earn the accolade FANTASTIC!

£4.95—state 16K or 48K Spectrum

Cheque/PO to:

PB Systems, BEES Centre,
Hay Lane, Braintree,
Essex CM7 6ST.

THIS'LL TEACH YOU A LESSON!!

(...or two)

GCE O LEVEL CSE Cassettes for the 48K SPECTRUM
with COLOUR and MOVING GRAPHICS

PHYSICS
6 Programs for £6.50

- * Solids, Liquids and Gases
- * Vectors and Scalars
- * Acceleration
- * Graphs of Motion
- * Gravity, Weight and Friction
- * Newton's Laws

CHEMISTRY
6 Programs for £6.50

- * Chemical Change
- * Types of Reaction
- * Rate of Reaction
- * Chemical Combination and the Mole
- * Chemical Equilibrium
- * Energy Changes

Cheque/PO (payee THINK TANK) to:
think tank Educational Software
Dept SU1 11, 35 Wellington Road,
Wimborston Park, London SW19 8EG

for your 48K Spectrum

"JUGGLER"

a personal financial budget program from Arrowsoft, written with humorous comment by an experienced bank lender. Also of interest to students and programmers as it uses advanced text compression and rapid display techniques. £4.95 post paid or s.a.e. for details of full range from:
Arrowsoft, Chatri, Lyngford Lane,
Taunton TA2 7LL.
arrowsoft

MAKE MONEY WRITING ZX-81 PROGRAMS

We could be interested in publishing your ZX-81 programs—big earnings potential. Send SAE for free details to:
NOVUS SOFTWARE
798 Pershore Road, Selly Park,
Birmingham B29 7NG.

Tune your TV for optimum performance by using "TV COLOUR TUNE"—an educational and instructive program for the 48K Spectrum giving CROSS HATCH and COLOUR-BAR SIGNALS with relevant back-up of the physics of colour TV transmission

£3.75 each, or get one

FREE

with every 3 titles ordered — see last month's AD for list or send SAE (9 x 4) for CATALOGUE.

We are now a major source of EDUCATIONAL programs ranging from INFANT to CSE/GCE. Top rate service and comprehensive supply only from:

LOCATOR
12 Fernhall Drive, Redbridge,
Essex IG4 5BN.
Tel: 01-550 5575.

SELEC SOFTWARE

ZX-81 MACHINE CODE SPECIALISTS

1K ZX-81 GAMES

THE BEST AVAILABLE

- MAZE GUZZLER/SUPERBREAKOUT
Superb Full Feature maze-chaser game, plus big-screen Breakout. £3.50
- THE INVADERS/TIMEBOMB
Original space invaders, plus a new spine-chilling game. £3.50
- ZX-PANIC/ZX-SQUASH
Two new big screen all action games. £3.50
- FREE CATALOGUE

Please send the items ticked to:

Name

Address

.....

I enclose cheque/PO for £.....

SELEC SOFTWARE

37 Councilor Lane,
Cheadle, Cheshire
061-428 7425

BORED WITH ARCADE GAMES??

—2 Addictive Simulation Games for the 48K Spectrum—

BREWERY

Bound to appeal to bored arcadists!! You are the owner of a small local Brewery. Your challenge is to effectively market your beer, expand, and become as big as Bass or Courage. But you'll need plenty of skill!! The game is Menu Driven, and has many excellent features.

Each programme costs £5.95, and is available from:

P. BOULTON

Dept SU3, 54 Grange Road, South Harrow, Middlesex, HA2 0LW.

GANGSTERS

A superb game of strategy. You are a small-time gangster: your challenge is to make The Big Time and take control of the City... by hook or crook. But you'll have to watch out for the other Gangsters! Packed with super features, the game is both amusing and addictive!

FIVE OF THE BEST FOR ZX SPECTRUM

1. THE HOBBIT	48K	£14.95
2. PENETRATOR	48K	£6.95
3. 3D COMBAT ZONE	48K	£5.95
4. CYBER RATS	16 or 48K	£5.95
5. BLACK HOLE	16 or 48K	£5.50

3 GOOD REASONS TO BUY FROM K-RAM
1. All cassettes checked and guaranteed to load
2. Postage and packing free
3. 50p discount voucher(s) with each order
cheques or postal orders to:

K-RAM
15 Danbury Road, Rainham, Essex RM13 7UR
Tel: (04027) 55629

ZX-81 REPAIR SERVICE

At last no need to wait for weeks, send your faulty ZX-81 for a fast reliable repair.

We will repair any ZX-81 kit or Ready

Built Unit.

Please describe the fault briefly and send a cheque/postal order to:

NEXT COMPUTER SYSTEMS

88 Harvest Road
Englefield Green
Surrey TW20 0QR

ONLY £15.95 + p&p £1.75
fully guaranteed.

IVYSOFT

is please to announce that it has moved to new premises at:

36 New Street,
Barbican,
Plymouth.

Mail order and telephone enquiries may still be made to:

91 Cleeve Drive,
Ivybridge,
Devon

(Telephone: (07554) 4088)

To celebrate our new opening, we will be offering a 10% discount on all orders received before August 15th. Over 200 Spectrum programs in stock including most of those advertised in this magazine. Wide selection of programs for other micros, including ZX-81. Telephone or send large SAE for our free 15 page catalogue.

Dealers—ask for details of our wholesale prices—amongst the most competitive rates around!



HORNBY SOFTWARE PRO GOLF SERIES

1. **PRO GOLF** Spectrum game, 16K and 48K. Realistic game. Highly popular. 9-hole course. Choose your own club, miss the bunkers, water, out of bounds. £4.95 incl. p&p.

2. **TROON** Spectrum game, 48K only. Highly skilful. 18-hole championship course with graphics. To any handicap. £6.95 incl. p&p.

3. And now **ROYAL BIRKDALE 1983 BRITISH CHAMPIONSHIP COURSE**. Spectrum game, 48K only. Play with the pros. £6.95 incl. p&p.

Hornby Software
21 Pinfold Hill
Leeds LS15 0PW.

A NVIL COMPUTING

SUPERB NEW SELF TEACH PROGRAM

For ZX-81 (16K), Spectrum.

TRS80, Video Genie.

*Now you can learn basic fast and efficiently *
*Forget your past programming problems. This program will make it all clear *

Cover Arrays, Sorting, Searching, Counting, Decision making tests, Error Trapping, Menu driving etc. You start with short simple programs and build up to full working programs with everything explained in full, precise detail.

*This is NOT a program you simply copy and run. *
*YOU HAVE GOT TO WORK!! *
But it is written in such a way that you can not get stuck.

This program has been fully tested over the past six months by 50 domestic and small business users and we have not received any adverse reports.

This program is our own product and is not available from any other source. Full money back guarantee. £4.75 incl. Postage & Packing (state which computer).

51 Whitcliffe Lane, Ripon, Yorks HG4 2LB.

CASSETTE RECORDER

Compatible with ZX-81, Spectrum and many other computers.

Features: Tape Counter
MIC, Ear and Rem Sockets
5 pin DIN socket
Volume Control
Botteries/Moins

Connects with leads supplied by Sinclair.

Money back guarantee if you are not fully satisfied.

Price: £22.95 (including P&P)

Cheques or money orders to:

Leyden Enterprises
41 Broomgrove Gardens,
Edgware,
Middlesex.

FOR HORSE RACING ENTHUSIASTS 'THE SETTLER'

Work out your winnings on accumulators, yankees, trebles etc. Available on cassette for ZX-81 (16K) or SPECTRUM. Includes the professionally used SAFE BET SYSTEM and also the NEW FORMULA STAKING PLAN at no extra cost! (Both these plans have been advertised in the S.C.R.B. for two years at £27.) This whole package for only £10.

Also available: the highly successful 'POOLS FOR PROFIT' system. NOT a forecasting program but a highly ingenious mathematically stratified method of entry. Complete checking program on cassette and full instructions etc. Price £10.

IMPORTANT—these are NOT games

But programs to help you earn money for a change. Mail remittance to:

BRITISH SPORTING SERVICES (SU)
45 Sandringham Road, Norwich

T.T.C.H. SOFTWARE 16K ZX-81: Phoenix Tower: Adventure up 15 levels for £2.50. Marsman: up the ladders and eat the dots £1.80. 1K Games: £1.80. 53 Granville Road, Northchurch, Berkhamsted, Herts HP4 3RW.

ZX81 & 16K Manual; Leads; etc. High Resolution Definable Graphic File Sixty; Keyboard; Eleven games: Plus Books worth approx. £175. Bargain £125 o.n.o. Tel: 01-675 1115.

40 CHARACTERS PER LINE for ZX Spectrum. No poking needed: uses normal list and print. Just add one USR statement. £3.99. Cheque/PO's to P. Bown, 38 Berton Close, Blunsdon, Swindon, Wilts SN2 4DE.

PRE-SCHOOL/EARLY SCHOOL CASSETTE suitable school/home. 7 Educational/stimulating programs for children 4-44 yrs! Written by teachers. 16K/48K Spectrum. £5 cheque/PO to Essex Software, Dept 1, 16 Huntsmans Drive, Upminster, Essex.

SERIOUS 48K Spectrum users. Monthly Payday program. Up to 50 employees, multi-departmental, all tax codes, pay levels etc, full revenue specifications, back-up. £15.00. MWS Software, 48 Torberry Drive, Petersfield, Hants GU31 4HP.

LEARN YOUR TABLES. 16/48K Spectrum Two Super Programs. Only £2.75 from: Sharma Software, 12 Barrington Court, Hutton, Brentwood, Essex, CM13 1AX.

16K ZX-81 still boxed, includes FD42 keyboard, three 16K quality games, two books; a beginners pack, worth over £150 will sell at £80 from C. W. Lee, 649 London Road, Wilmorton, Derby.

BANNED → All arcade-action games from our lists. We specialise in a wide range of adventure and business games from many independent suppliers. Save time, deal with the specialists. Detailed lists supplied. Sagasoft, 148 Barrack Road, Christchurch, Dorset BH23 2BD.

GOLDEN OPPORTUNITY. Sinclair Printers only £49.95, ZX-81 £45, Sinclair 16K Ram £24.50. Postage & Packing £2.00. Hurry while stocks last. Grosco Supplies (Dept SU), 148 Barrack Road, Christchurch, Dorset BH23 2BD. Tel: (0202) 486207.

16K SPECTRUM TIME TELLER. Tests and helps children learning to tell the time. Educational program for School or Home use. Tested in primary school, £4.50. D. C. Penn, School House, Bothel, Carlisle, Cumbria.

SPECTRUM 16K CRAZY CONG AND PACK-MAN. Both on one cassette £3.00 including P&P. Cheques/PO to A. Goble, 18 Buckland Road, Leyton, London E10 6QS. Also good quality games required.

SPECTRUM TAPE EXCHANGES. Exchange your unwanted Spectrum software for only £1.00 each tape. Send s.a.e. for list and details to 34 Avondale Road, Nelson, Lancs BB9 0DA.

16/48K SPECTRUM ROAD RACE—a must for all arcade-game lovers. Guide your car over shark infested waters, by controlling your speed wisely. Avoid capture from Cannibals. Use your knowledge to avoid almost certain death in 3/D snakepits! Survive to enjoy a 3/D finish. Available from: Sean Bailey, 23 Stalin Road, Colchester, Essex. £4.00 inc. P&P (on cassette).

TECHNICAL GRAPHICS drawing program for 48K Spectrum. Orthographic, isometric projection. Perspective. Isometric circles, shading etc. Cheque, PO £5.00 J. Van Lopik, Sunnycroft, Wreilton, Pickering, N. Yorks.

PLAY THE GUITAR. 48K Spectrum Tuition Program by professional musician. Plays the music as you learn. £7.00. Scott Massie, No. 1 Bungalow, Firlands, Hollybush Lane, Burghfield Common, Berks.

16K ZX81 "Egods Castle", Attack the Monsters of the Mazes and Dungeons to get the Treasure. Excellent graphics, cassette with full instructions: £3.50. G. Haynes, Links Croft, Tors Road, Okehampton, Devon.

MicroPen professional word processor. Angles unique strategy game. Cribbage brilliant graphics version—highly addictive. 16K/48K Spectrum. All at £4.95, from Minimal Systems, 95 Green Park Road, Southampton.

COMPUTER RF OUTPUT and TV AERIAL COMBINER. Low loss, saves replugging, £2.75. Two way aerial switch £2.75. Aerial/Accessories Catalogue 54p. South West Aerials, 11 Kent Road, Parkstone, Poole, Dorset.

ZX-81 16K plus joystick, graphics board, and proper keyboard, sound box plus many games tapes. Arrival of BBC Micro forces sale. Best offer over £50. Tel: 0624 781674. Mr Garfield.

ZX-81: 1600 BYTES M/C-code routines. Screen effects, animation, program aids, etc. Detailed instructions can be placed anywhere in memory. Very user friendly £3.50. J. Riley, 322 Bramhall Lane South, Bramhall, Stockport, Cheshire.

REDSPEC. Takes the drudgery out of misery! Calculates age, service, notice and payment for redundancy. Written and used by Personnel Managers. £4.00. R. J. Fishwick, 87 Ewesley Road, Sunderland SR4 7RJ. (16K/48K Spectrum).

★ ZX SOFTWARE ★

UTILITY FILE FOR SPECTRUM 48K — 2 functional programs on 1 tape.

*General file — a multi-purpose filing system which stores 200 records per file. Example uses: collections (records, stamps etc), customer/employee/enquiry data, inventories, phone index etc etc. Ideal for home/business use.

*Pagepro — a practical method of storing/printing pages of information. Example applications: letters, text, menus, lists etc etc.

Both programs have full user facilities and output to screen or ZX Printer. Easy to operate. Supplied on computer cassette with instructions. Price: \$9.95. General File and Pagepro are also available separately at \$5.95 each. Send Cheque/PO or large SAE for full details to:

5D Micro-systems,
PO Box 24, Hitchin, Herts SG4 0AE.

ZX81 SPECTRUM, DRAGON, BBC AND VIC SOFTWARE LENDING LIBRARY

We have for hire from 50p (inc. post) programs for your computer.

£5 life membership (less than the cost of a single game) brings you the SOFTWARE LENDING LIBRARY membership kit, catalogue and news letter.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO Box 3, Castleford, West Yorks
Stating name, address and computer type.

All tapes used with manufacturers' permission

HOME STUDY LTD.

TRELEIGH WOODS FARM REDRUTH CORNWALL

48K SPECTRUM PHYSICS 'O' LEVEL A.E.B. Syllabus 052 1983/4

8	TEACHING PROGRAMS (including games) C30 (EXCELLENT FOR ALL SYLLABUSES)	£8.40
8	PAPER 1 (multiple choice) PROGRAMS 400 questions	(C30) £5.15
13	PAPER 2 (practical) PROGRAMS 39 questions	(C30) £5.15
8	PAPER 3 (theory) PROGRAMS 128 questions	(C30) £5.15

All programs feature instant answers, instant explanations, probable grade estimate.

THE COMPLETE SET (2 x C60) £22.00

PROGRAMS AND DETAILS FROM:

HOMESTUDY LTD

Mike Hampson proudly presents the ONLY

SPECTRUM FORTH WITH FLOATING-POINT

At last! An alternative language with program power! Programmers in their thousands are turning to FORTH as the number one alternative to BASIC and MACHINE CODE because of its incredible SPEED and SIMPLICITY, and now the first ZX Spectrum FORTH with floating-point arithmetic brings a new language with SPEED and POWER to the 48K Spectrum owner.

- ★ All trig functions in radians AND degrees
- ★ Operation of ZX printer
- ★ Full floating-point arithmetic
- ★ Easily mixable integer option included
- ★ Full global control of colour, sound and high-resolution graphics
- ★ CIRCLE, DRAW, OVER etc
- ★ BEEP (like BASIC) plus BLEEP, for machine-code-style sound effects
- ★ Based on FORTH-79 (like the Jupiter Ace)
- ★ Includes all FORTH structures, and recursion
- ★ 190 predefined words
- ★ 32K available to user
- ★ Complete tutorial user manual
- ★ £2 off if you cut out and send this advertisement

Order code FP50T Price £14.95

Cheques/POs to: Mike Hampson
7 Hereford Drive
Clitheroe
Lancs BB7 1JP

Reach an estimated readership of over 200,000 users per month for as little as £2.00*.

Or if you are starting your own small business advertise in the supermart for only £10.00.

Yes all you have to do is fill in the coupon below including your name, address and/or telephone number and send to: Supermart, Sinclair User, ECC Publications, 30-31 Islington Green, London N1 8BJ.

Maximum 30 words.

Your advert will appear in the earliest possible edition.

Name

Address

..... Tel: ;

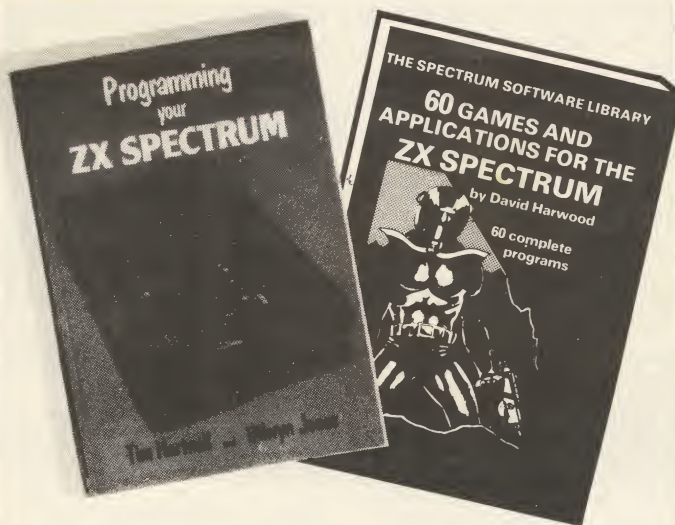
Have you included the fee of £2.00 or £10.00?

*for second hand sales only

Conditions

The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libelous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

SPECTRUM



Make the most of your Spectrum, with these acclaimed books from the experts!

- () **INSTANT SPECTRUM PROGRAMMING** — Tim Hartnell. Spoken word C-60 cassette with book containing many major programs, to teach you programming the Spectrum from first steps. The ideal guide if the Spectrum is your first computer. £4.95.
- () **CREATING ARCADE GAMES ON THE ZX SPECTRUM** — Daniel Haywood. Full programming instructions to improve and enhance your own work, with 17 major programs listed in full as a bonus. £3.95.
- () **PROGRAMMING YOUR ZX SPECTRUM** — Tim Hartnell and Dilwyn Jones. 200 pages, more than 100 programs, to take you through programming the Spectrum from the beginning. Written by Tim Hartnell, the most widely published ZX author in the world. Recommended by PCW, Sinclair User and Personal Computer Today. £6.95.
- () **BEYOND SIMPLE BASIC — DELVING DEEPER INTO YOUR ZX SPECTRUM** — Dilwyn Jones. When you've mastered introductory programming on the Spectrum, you need this outstanding guide to enhanced programming techniques and concepts. £7.95.
- () **60 GAMES AND APPLICATIONS FOR THE SPECTRUM** — David Harwood. Arcade games, intelligent board games, brain games and utility programs, they're all here. Just £4.95.
- () **GAMES ZX COMPUTERS PLAY** — edited by Tim Hartnell. Thirty great games for your ZX computer, 15 for the Spectrum, 15 for the 16K ZX81. Only £3.25.

Interface Publications,
Dept. SC
44-46 Earls Court Road, London, W8 6EJ.

Please send me the books indicated above. I enclose £

Name

Address

MAIL ORDER ADVERTISING British Code of Advertising Practice

Advertisements in this publication are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is paid in advance, the code requires advertisers to fulfil orders within 28 days, unless a longer delivery period is stated. Where goods are returned undamaged within seven days, the purchaser's money must be refunded. Please retain proof of postage/despatch, as this may be needed.

Mail Order Protection Scheme

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Sinclair User* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided:

- (1) You have not received the goods or had your money returned; and
- (2) You write to the Publisher of *Sinclair User* summarizing the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you do write, we will tell you how to make your claim and what evidence of payment is required.

We guarantee to meet claims from readers in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent (up to a limit of £4,250 per annum for any one Advertiser so affected and up to £10,000 per annum in respect of all insolvent Advertisers. Claims may be paid for higher amounts, or when the above procedure has not been complied with at the discretion of *Sinclair User*, but we do not guarantee to do so in view of the need to set some limit to this commitment and to learn quickly of readers' difficulties).

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine (not, for example, payment made in response to catalogues etc, received as a result of answering such advertisements). Classified advertisements are excluded.

Advertisement Index

AGF Hardware	54, 55	MC Lothlorien	72
Abersoft	77	Maplin	22
Addictive Games	46	Martech Games	34
Afdec Electronics Ltd	80	Melbourne House Publishers	47
Altotech	74	Memotech Add-Ons	98
Artic Computing	20, 21	Micro Power	15
Basicare Microsystems	51	Microl	81-83
Bi-Pak	73	Micronet 800	114
Bridgemaster	74	Microsphere	26
Buffer Micro Shop	52	Microtext (U.K.) Ltd	46
CCS	38	Mikro Gen	35
CP Software	15	Museward Ltd	90
Calpac Computer Software	34	Mr B S McAlley	97
Cambridge Computer Store	73	Odyssey Computing	97
Cambridge Computing	44	Oxford Computer Publishing	95
Campbell Systems	97	Orwin Software	88
Carnell Software Ltd	26	P H Scientific	100
Cascade Software	76	PSS	50
Cheetah Marketing	16	Picturesque	46
Compocsys	100	Print & Plotter	8
Compusound	76	Protek Computers Ltd	71
Computer Add-Ons	4, 15	Quest Micro Software	85, 116
Computerlock	100	Quicksilver	103
Crystal Computing	27	R & R Software	51
DJL Software	52	Rotronics	89
DK 'Tronics	6, 7	Servodata Ltd	77
Datel Electronics	92	Richard Shepherd Software	56, 75
Dean Electronics	73	Silversoft	30
Digital Integration	45	Sinclair Research Ltd	39-42
East London Robotics	12	Sirius Logic	91
Educare	99	Softtech	45
Felix Software	52, 116	Software Library	99
File Sixty	11	Software Supermarket	112, 113
Mr A Firminger	34	Spectrum Associates	103-107
Fountain Computers Ltd	90	Stellar Software	92
Fox Electronics	53	Supermart	120, 121
Neil Gibson & Co	114	Tandy Corp.	114
Good Computing Book	96	Tasman Software	91
J K Greye Enterprises	114	Texgate	91
J M Hampson	121	Timedata	72
Hestacrest Ltd	72	Transform Ltd	94
Hilderbay	74	Tutorial Software	100
Hilton Computer Services	95	University Software	76
Interface	122	Virgin Games	19
Kayde	IBC	Video Productions	92
Kempston (Micro)	84	Winters Ltd	99
Electronics	IFC, 35	Wye Valley Software	77
Kernow Software Services	26	ZX Microfair	28, 29
Legend	108, 109		
Load Runner	84		

KAYDE

KEYBOARDS - ZX81 Spectrum.

Features include

ZX81 Repeat key and Spectrum Double shift key.

All keyboards are 'electric typewriter' quality, full size and are fully built and tested.

They allow you to use all other add-ons. No extra power is needed. Fully guaranteed.

A fitting service is available for all our keyboards and costs £4.00 including postage and packing. Send for details.



Kayde Standard Keyboard

This is used for both computers, but does not accommodate them inside the casing. Open your computer and plug in the connector. (The ZX81 requires two simple solder connections). The keyboard comes complete with high-impact black plastic case and full fitting instructions. The ZX81 has a repeat key. £30

NEW! NEW! NEW! NEW! NEW! NEW! NEW!

Kayde ZX81 16K RAM Pack

Low power feature allows you to use all other add-ons including ZX81 printer without wobble overheating or memory loss. You should only have to buy one RAM Pack for your ZX81 so buy the best at the beginning and save yourself unnecessary problems. £19.50

VALUE! VALUE! VALUE! VALUE! VALUE! VALUE!



Kayde 4K Graphics ROM Pack

This comes complete with a pre-programmed 4K Graphics ROM to give you an extra 450 graphics. The board has facilities for either 2K of RAM (for user definable graphics) 4K of RAM or our 4K Tool Kit. The entire board fits neatly inside your computer.

A free fitting service is available on request.

4K Graphics Board £19.95

4K Tool Kit £9.95

2K UDG ROM and Character

Generator Cassette £10.95

16K Graphic Software Peckman

New! Ladders £5.95

Mail Order + Showroom

Kayde Electronic Systems Ltd., The Conge

Great Yarmouth Norfolk NR30 1PJ

Tel: (0493) 55253/57867 Telex: 975525 KAYDE G.

Kayde Super Plug-in Keyboard

This is the ultimate keyboard for your Sinclair computer, you simply plug it into the user port at the back. No disassembling. Complete with full-size space bar and ZX81 repeat key. £49.95

NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW! NEW!

Kayde Spectrum 32K RAM Pack (Issue II)

This brings your Spectrum up to a full 48K.

It is easily fitted, and comes as a kit with RAM chips that slot into existing connectors.

No soldering necessary. £35.95



RAM Packs

All Kayde RAM Packs use state of the art technology and feature top-quality, low power memories. Housed in high-impact polystyrene, they look good and are fully tested and guaranteed.

VALUE! VALUE! VALUE! VALUE! VALUE! VALUE!

Kayde Spectrum Sound Module

This module fits neatly inside your Spectrum and lets the sound come through the more powerful speaker on your television rather than the Spectrum. No soldering required. £9.95

Kayde BBC/Spectrum Sound Module.

This sound module plugs into the user port at the rear of your computer and requires no soldering. £12.95

Kayde Keys (VIC 20)

This program runs on just 300 bytes and yet gives you the use of function keys and characters on a VIC 20, and there are over 25 commands at your disposal. £6.95

Design/Restore (VIC 20)

A complete system to enable you to create your own characters. Also includes restore program to load characters into your VIC. Three character sets included. £9.95

New London Showroom

Kayde Home Computers Ltd 1 Station Approach

New Eltham London SE9 Tel: 01-859 7505



NEW!

KAYDE DELUXE KEYBOARD

This keyboard is only available for the spectrum. It will allow you to fit your computer inside. It also has a full sized space bar and double shift key. No soldering required. £45.00

Kayde Spectrum Light Pen.

This has the ability to create pictures, sketches or graphs on your own television screen or it can be used to 'pick' from the menu saving you time over using BASIC programming statements. No knowledge of machine code programming is necessary. Each Light Pen comes complete with interface circuits mounted on a connector which plugs directly into the user port with no other connections to make and a software program with comprehensive instructions. £19.95



NEW! NEW! NEW! NEW! NEW! NEW! NEW!



Kayde Software The Swamp
Available for VIC 20, (16K)
Dragon 32,
New Brain,
Oric 48 and
48k Spectrum

Death stalks the Swamp at every turn. Nowhere is safe and you're on your own. You survive on your wits alone with nobody to help you. Be thankful it's only the latest game from Kayde You'll gasp with relief when you come to the end of the struggle against some of the most dangerous monsters ever programmed. You can be sorcerer, wise man, mercenary, knight or a druid. But you've got to be good. No silly problems to hinder your progress. It's just you against the swamp. **£9.95**

SOFTWARE WRITERS WANTED

If you want the best deal for your original programs then send a copy to us for review. We offer highest royalties, security and marketing. Don't forget to include a description of the program and for what machine it is intended.

Mail Order Lists

For full mail order lists write to the address below.

ALL ITEMS AVAILABLE AT GREENS STORES

DEPT IN DEBENHAMS

24 HOUR TELEPHONE SERVICE:

Tel: (0493) 55253/57867

Dealers Welcome

ALL MAIL ORDERS TO: KAYDE ELECTRONIC SYSTEMS LTD, DEPT. SU 7 THE CONGE, GREAT YARMOUTH, NORFOLK NR30 1PJ

PLEASE PRINT AND STATE TYPE OF COMPUTER

Qty	Item	Item Price £	Total £

Please allow £2.00 P&P for all Hardware 50p for all software



DON'T FORGET YOU CAN ALWAYS ORDER ON THE TELEPHONE WITH YOUR CREDIT CARD. DEALERS WELCOME.

*I enclose a cheque/postal order payable to **KAYDE Electronic Systems Ltd**, for

£ *Please charge to my Access/Barclaycard/Trustcard account no.

*Please delete/complete as applicable.

Signature

Name: Mr/Mrs/Miss

Address

SPECTRUM SOFTWARE

TIME-GATE

4D Space/time adventure in fast moving graphics. 48K.

Author: **John Hollis**
THE CHESS PLAYER

With Speech and personality. 48K.

Author: **Martin Wren-Hilton**
METEOR STORM

With speech and Hi Res Graphics. 16K or 48K.

Author: **John Hollis**
SPACE INTRUDERS

With mutants and Hi Res Graphics. 16K or 48K.

Author: **John Hollis**
EASYSPEAK

Add speech or music to your programs. 48K.

Author: **John Hollis**
MINED-OUT

With 9 levels of minefield. 48K.

Author: **Ian Andrew**
SOFTWARE

FOR THE ZX81 WITH 16K RAM

QS ASTEROIDS

"...very good..."
"...addictive game!"

(C. & V.G.).

Author: **John Hollis**
QS DEFENDA

"...better than any other arcade game I've seen."

(Sync.).

Author: **Nick Lambert**
QS SCRAMBLE

"...amazing, fantastic!"

(PC.W.).

Author: **Dave Edwards**
QS INVADERS

"...just like the real thing!"

(C. & V.G.).

Author: **Dave Edwards**
MUNCHEES

Features 1 to 4 Ghosts, 3 Munchees, Power pills

Author: **A. Laird**
GALAXIANS & GLOOPS

Features two types of swooping Galaxian.

Author: **T. Beckwith**
CROAKA-CRAWLA

With Frogs, Lories, Logs, Crocodiles, Turtles, Flies.

Author: **John Field**

SPECTRUM & ZX81 GAMES FROM QUICKSILVA

A WHOLE GALAXY OF ACTION AT YOUR FINGERTIPS

NEW RELEASES FOR THE ZX81 & SPECTRUM

SPECTRUM FRENZY

Arcade action

Features: Full colour hi-res graphics, sound, high score table, hold feature. 5 levels of robots, Evil Orville, the minelayer, exploding pods, progressive difficulty, attract mode.

Author: **David Shea**
ASTRO BLASTER

Arcade action

Features: Full attract mode, 5 attack waves, 15 levels of difficulty, rapid fire, meteor storms, changing aliens, plasma bolts, killer bombs, full colour hi-res graphics, full sound.

Author: **John Edwards**
EDDIE A WORD PROCESSOR

Features:

Menu driven prompts given at all times. Drastic commands — e.g. Clear Text — are automatically questioned. Load/save commands... all text justified, on screen as well as printer.

Author: **P. Baker**
48K Spectrum

PIXEL GAMES FOR THE ZX81 WITH 16K RAM

TRADER

A trilogy of 16K programs that combine to give an epic 48K galactic adventure. As a galactic trader, you deal with some very bizarre customers indeed.

STOP PRESS

Trader now available for the Spectrum £9.95

SUBSPACE STRIKER/ZOR

With your deadly animat torpedoes, you unleash havoc in the Federation's Spacelanes.

STARQUEST/ENCOUNTER

With the help of your onboard computer you seek a habitable planet amidst the perils of deep space.

ZX81 GAMES OCEAN TRADER

An adventure set in the 19th Century.

You own and captain a vessel, sail between 5 ports and deal in coal and whisky; with storms, pirates, sea mist and vessels adrift.

Author: **A. Morgan**
ZX81 with 16K RAM

COSMIC GUERRILLA

Arcade action

Fast m/c action, will drive QS sound and character boards, responsive controls, high score tables.

Author: **C. K. Tame**
ZX81 with 16K RAM

3D BLACK STAR

Arcade action

Features: Fast 3D graphics, fast scoring, four types of target. Eight instrument displays, warp drive, resurging aliens, time limit, 17 levels of progressive difficulty, high score table.

Author: **M. Sudworth**
ZX81 with 16K RAM

DAMPER & GLOOPER

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, stall frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: **R. Crane**
ZX81 with 16K RAM

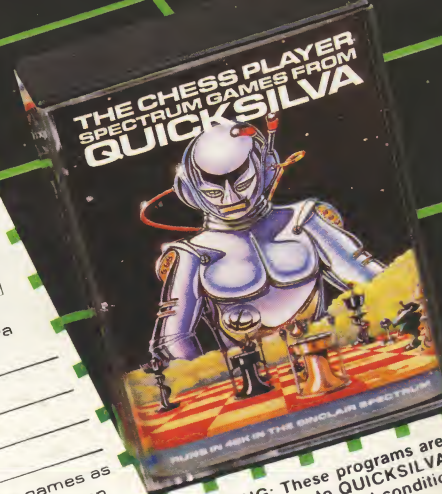
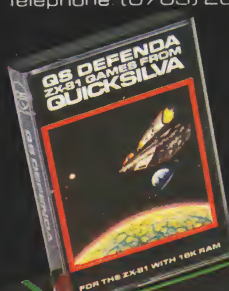
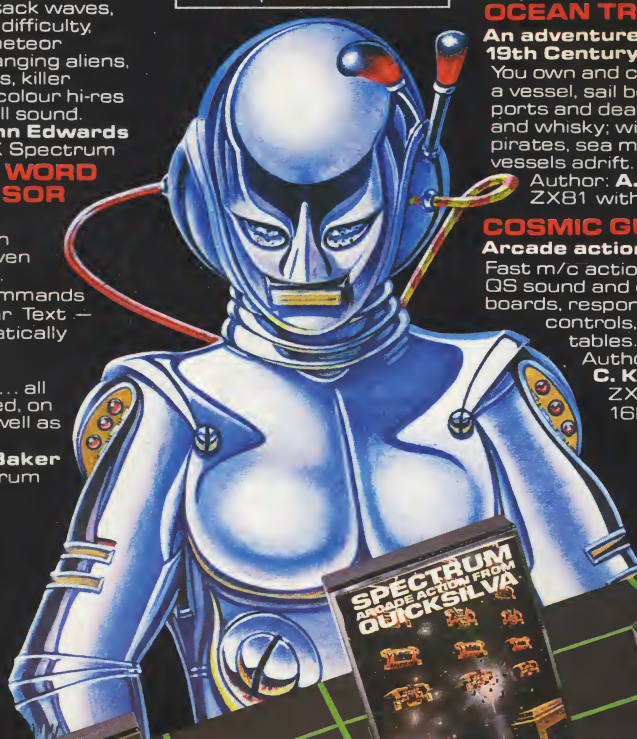
PIONEER TRAIL

A western adventure

Features: 20 levels of play. "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: **Marion Stubbs**
ZX81 with 16K RAM

Quicksilva Limited, Palmerston Park House, 13, Palmerston Road, Southampton, SO1 1LL Telephone (0703) 20169



SPECTRUM GAMES

Time Gate £6.95
Frenzy £4.95
Mined-Out £4.95
Easyspeak £4.95
Astro Blaster £4.95
Meteor Storm £6.95
The Chess Player £4.95
Space Intruders £5.95
Eddie A Word £9.95
Processor
Trader

PIXEL GAMES FOR ZX81

Trader £9.95
Subspace Striker £3.95
Starquest & Encounter £3.95

ZX81 GAMES

QS Asteroids £3.95
QS Defenda £3.95
QS Scramble £3.95
QS Invaders £3.95
Croaka-Crawla £4.95
Galaxians & Gloops £3.95
Munchees

Black Star £4.95
Cosmic Guerilla £3.95
Damper & Glooper £3.95
Ocean Trader £3.95
Pioneer Trail

Cheque payable to Quicksilva

Send order to: Quicksilva Limited, Palmerston Park House, 13, Palmerston Road, Southampton.

Please send me the games as ticked. Supplied on _____
Cassette

WARNING: These programs are sold according to trade and conditions of sale. Copies of which are available on request.